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The Skipulter

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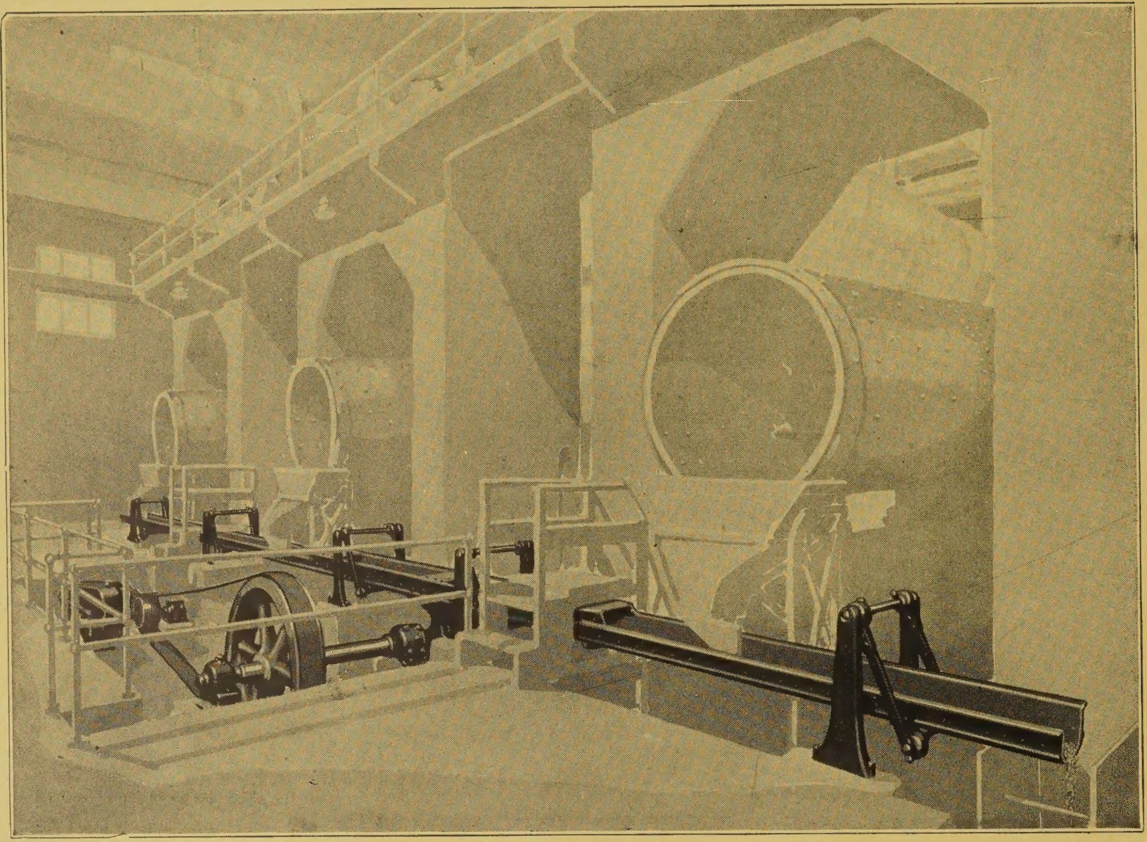

A Skipulter installed in a western cement plant, where it is conveying cement clinker, discharged from three coolers, to an elevator

THE Skipulter is an improved type of shaker conveyor for transporting coarse materials, such as cement clinker, coal, ore, slag, rock, limestone, etc.

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MILL SECTION of

Concrete

The Cement Mill Edition of Concrete is edited exclusively for those interested in the manufacture of cement. Its pages are devoted to discussions of plant design, management, operation, production efficiency, chemical research and control, quarry operation, progress and news of the industry.

The Cement Mill Edition also contains all the material published in the corresponding Regular Edition and so provides news of the uses and merchandising of the materials whose manufacture is discussed in the Mill Edition. The Regular Section furnishes mill operating officials and mill executives valuable points of contact with the users of the materials they produce.

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These articles will be of particular interest to every cement manufacturer because they represent the opinions of concrete users regarding future developments in the product they manufacture.

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MILL SECTION of

Concrete

Vol. 34 Chicago, March, 1929 No. 3

The Future of Cement

A Composite Opinion of the Probable Developments That May Be Expected in the Cement Industry from the Viewpoints of Manufacturing Methods, Quality and Types of Cements, Sales and Distribution Methods, Etc.

AT a recent group gathering, composed of men representing a wide diversity of industries, the discussion swung around to an attempt to find some common problem that, in the years immediately ahead, would be of greatest importance to industrial executives.

The common ground was found in the word ***"change."*** And a corollary problem, closely linked to it, was the problem of obsolescence of manufacturing equipment and plant.

The cement industry is not alone in facing this great modern problem and in trying to find an indication of its effect on shaping policies for the years immediately ahead.

It would be fine if it were possible just to ignore those movements which are forcing change, or if it were possible in some manner to hold those forces in check and thus go on serenely in the path we have grown accustomed to.

But this, unfortunately, is often impossible. The next best thing, then, is to look this problem of change squarely in the face and lay plans for meeting the new developments in a manner that will upset the industry least and keep it on a constructive, forward path.

To do this, it is necessary to look ahead—to consider possible means of meeting these changes and to be ready for them. With this need in mind, we have asked a number of cement plant designers, chemists and executives to present pictures of the future of the cement industry as they see it from their points of view.

These "forecasts" will be found on the following pages.

It is suggested, also, that the cement manufacturer study those articles in the construction section of this issue, in which leaders in various branches of the industry look ahead and present their opinions regarding future developments in the ***uses*** of cement.

What Do Buyers Want?

By S. E. HUTTON
Chief Engineer, Pacific Coast Cement Co. Project,
Seattle, Wash.

THE cement business, like any other, is a matter of economics of which cement technology is only a part. Concrete technology, the aims of designers and builders, and the preferences of workmen and contractors must be taken into account in determining what the cement manufacturer must do at the present, and must be prepared to do in the future if he would succeed or survive.

Workmen seem to have a decided preference for plastic cement and easily workable concrete mixes, without regard to the owner's or employer's interests, and probably with no further regard for their own interests than a preference for agreeable working conditions. A number of manufacturers have responded to the demand for plastic cement by furnishing mixtures of cement and diatomaceous earth.

It must be admitted that the working properties of cements have an important bearing on the marketing of them, and merit further consideration. This involves the economics and technical problems of fine grinding, and of cooler design and operation, as well as the practice of water-quenching clinker.

The preferences of cement users largely determine the types of cement that will be manufactured.

What are the preferences
—of the concrete contractor?
—of the workmen?
—of the builder?
—of the products manufacturer?

It may be difficult for all plants to attempt to meet all these preferences fully.

Some manufacturers are diversifying their product. Others are not.

The following article presents some helpful thoughts on these persistent questions.

The contractor is usually interested principally in the cost of cement in the mix, not excluding indirect costs incurred through various business relations, and in the purchase of other construction materials. Indirect costs or influences not infrequently determine the choice of brand of cement used in a job. This will become more common as the practice of equalizing cost on the job, rather than at the mill, spreads.

The interests of the builder are much more a matter of concrete technology and practice than of cement quality, the standard specifications having made cement quality practically a constant among the many variables entering into concrete quality. There is a question whether present practice in concrete construction warrants any improvement in the present standard of quality of cement.

In certain applications, probably more numerous than generally recognized, substantial savings of time and money can be made through improved practice in the use of standard cement, and through the use of early high-strength cement, but it is not safe to assume that it would be economically sound to abandon present standards and adopt the later innovations for all concrete applications. In some cases it may be found desirable for one mill in a district to make a special cement to be marketed by all the manufacturers in the district.

Notwithstanding the careful accounting carried on in production departments, it is probable that few if any manufacturers really know the total costs of returnable cement sacks, for there are adjustments and numerous indirect expenses incurred in settling sack disputes that probably never appear in public as bag costs. The returnable bag is the cause of innumerable cases of irritation of consumer, dealer, and manufacturer, not beneficial to the industry. The use of the paper bag seems to be a problem not merely for the individual manufacturer but for the cement industry.

Deliveries of sacked cement by truck, and of bulk cement by truck and by railway car will undoubtedly increase, particularly in the more densely populated districts. Ready-mixed concrete has been adapted to almost every requirement, including the pouring of silo walls requiring continuous deliveries, day and night over a period of eight days. It is based on economically sound principles, and its use will continue to grow.

In any research job, four tasks, at least, are confronted; first, to determine clearly the object of the investigation; second, to recognize and enumerate the influences or terms entering into any experiment or problem; third, to evaluate them, and fourth, to hold constant all, or as many as possible, of them while one, or a few are under investigation. Obviously, a tremendous number of matters enter into the economics of a cement manufacturing and marketing enterprise, and there is an almost infinite number of combinations of them. Many are "irreducibles," and the best possible combination is necessarily a matter of judgment, based on a combination of some more or less exact, and much very inexact data. Obviously, no simple rule or rules can serve as an infallible guide in determining right action in every event. Extensive and continuous investigation of not only the engieering and chemical problems, but also of the business economics of the cement industry must be carried on, and all of them must be considered together in order to determine the value of any one of them.

There can be no question as to the wisdom of carrying on further investigations of the chemical and physical problems of cement making, and of extending and making more precise the control of the mill processes, that is, of substituting in a greater degree science for art in production.

The design of the cement plant of the future will be determined by the progress made in determining more in detail what physical and chemical phenomena are really essential to the production of good cement at low cost, and upon economic considerations. The practical limit of the steady drift toward greater capital and lower labor costs may soon be found.

Industry *vs.* Industry

By ROBERT W. LESLEY
Honorary Member, American Society for Testing Materials,
Philadelphia, Pa.

From many different sources we have heard about "the new competition"—the struggle of industry against industry. This new competition, making itself definitely felt during the last year or two, promises to play a more important part in all industry during the years immediately ahead.

What effect *is* it having and ***will*** it have in the future on the cement industry? How will it influence manufacturing, sales and distribution of cement?

In this article, R. W. Lesley, one of the pioneers in the cement industry and one of its keenest analysts, looks into the future and applies the new trends specifically to certain present and future conditions in cement manufacture and marketing.

WE all know what portland cement is and are familiar with the slogan, "Concrete for Permanence." With ll that we have read about cement from its earliest days the present we do know that work done with the mateial in question is permanent. Portland cement when sold sold to stay sold and is not subject to the changes of ashion and the whims of men and women, as in the case f many of the articles of dress and fashion.

he New Competition

For the above reason the portland cement manufacırer might well consider that his only competition is with is fellow manufacturer and that if he produces enough to ıeet the normal demand there is no need of further work r research. This may have been true, but today has rought forth a new competition.

In a recent address by R. Perry Shorts, of Michigan, e has well called attention to what this warfare means. le speaks of oil fighting coal to heat the country and lectricity fighting ice to cool it; of gas making a bid to ıonopolize the whole show by producing both heat and old; of steel fighting wood; cement fighting steel; lumber ighting cement, and Celotex giving lumber the greatest ight of its long and honorable career. He says: "Simply nnounce that you are thinking of building a house and ou will be hounded to death by 57 varieties of material nen. From the cellar to the garret you must listen to rguments of brick against cement, metal against wood, vallboard against plaster, and so on to the roof—and at ast, your house finished and furnished, you throw yourelf exhausted into the beckoning folds of your dear old eather bed."

In view of what is above stated, which we all know loes exist, it seems to be but fit that we should examine vhat we are doing individually and in co-operation to hold our own in this "new competition." First and foremost, co-operatively, through the Portland Cement Association, the fields for the use of cement are being constantly broadened; and by the association's literature, its laboratory and its field engineers, the reputation of cement as a building material has been thoroughly, definitely and positively established. It is fortunate for our industry that from its earliest day it has been in the closest touch with the leading engineers; and it is a tribute to its fairness and its sense of right that the Portland Cement Association is practically the only industrial trade organization which has representation as a unit in many of the great engineering joint committees dealing with the testing of materials.

Fortunately, portland cement, like steel, is sold upon a standard specification; and in "the new competition" it differs in this particular from many of the ordinary materials sold in general trade, the building industry, food, dress, decoration, etc.

As the country grows, the use of cement in its various forms is likely to largely increase; and when in retrospect we look at the limited use of our material in the early days of the Portland Cement Association and contrast it with the greatly extended and enlarged use of today, it is safe to predict that if the same energy, good judgment, scientific knowledge and research continue in our industry, portland cement is bound to hold its own in the years to come.

Distribution

In dealing with a heavy material weighing nearly 400 pounds to a barrel, the question of transportation is a vital one in the field of competition. Originally the early cement mills were located far from cities, in the countryside, where lime, clay and other raw materials were accessible;

and the finished product was in turn shipped by rail to the centers of population and trade. It was predicted some 25 years ago that in time the cement industry would be a "brickyard" proposition, meaning that the cement mills of the future would be located in close proximity to centers of population. The present day is bearing out this prediction, but generally in a different sense from that in which it was made. Hauling by truck, where the finished material is loaded at the mill door and is not handled until it reaches the job where it is to be used, has made an enormous change in transportation methods, superseding as it does the old way of loading on cars and rehandling, in many cases by truck to warehouse and then to the job, in order to reach its ultimate use. This new feature has made a great change in shipping conditions at many mills situated at considerable distances from commercial centers. Due to this also, in a number of cases cement plants have been located in outlying suburbs of large cities; and, by reason of the trucking methods and short hauls, have succeeded well, in the face of possible higher labor costs of production.

Another phase of competition is seen in the building by mills on the Great Lakes of cement storage silos at many of the leading lake cities. The finished product is piped in bulk into special constructed tank steamers and again is piped into the silos of the companies along the lake fronts of the various cities, whence it is trucked to the consumer's job. At Buffalo a very interesting condition is noticeable. There are three large cement works in that city, manufacturing cement largely from limestone brought from quarries on the upper Great Lakes, and this raw material is transported with its carbonic acid content from the quarries on the upper lakes to Buffalo and must be stored during the winter months. By establishing silos in the city of Buffalo, one of the cement companies on the upper lakes is said to save considerable freight, storage and handling cost by transporting the finished product by water and delivering from the silos direct to customers by trucks. As time goes on it is to be expected that, with the increase of good roads and the improvement in motor trucks and bulk tank steamers, great progress will be made in this field of distribution.

Manufacture

While the past ten years have seen a great advance in manufacturing methods, it is likely that the next five or ten years will see still greater advances. In our own industry there is competition between the wet and the dry processes of making cement; and it is an interesting fact that so great has been the advance in the wet way that at the present time, among the mills reporting to the Portland Cement Association, there is about an equal number manufacturing under each process, while the average man-hours per barrel is almost equal in the two processes.

Many improvements have of late years been made in the quarrying operations of our cement mills, the caterpillar steam shovel being one of the most important; and many improvements may be expected in the future in view of the great increase in the crushed stone industry, which is growing so fast all over the country and which as a new industry is showing great enterprise in its quarrying operations.

The "burning question" is a vital one in the cement industry. In many departments of the mill great economies have been made, but in the field of fuel and kilns there has not been a corresponding development, though in many directions improvement is being shown. The portland cement kiln is not living up to its requirements as a machine for calcining raw material for portland cement. It does show economical operation in the burning of portland cement material and in the production contemporaneously of power for the grinding and other mill operations; but as a machine, where the heat produced by the fuel is devoted alone to the clinkering of the raw material, there is a wide margin of loss in heat units; and as the price of electricity for power operations is reduced by improvements in the great electrical power houses serving customers all over the country, the economical addition of waste heat boilers to cement kilns becomes more and more an open question, involving as it does great outlays of capital. This brings about therefore the consideration in the future of the industry of proper methods of burning raw cement materials with the minimum fuel.

In Germany the vertical kiln, with its newly improved feed and discharge, shows a very much reduced amount of coal per barrel of clinker produced, coming down to very near ideal figures. In some of the large English works, by the use of chains in the kiln to scatter the wet slurry, the exit heat temperatures of the kiln are much reduced and the burning cost is low. By filter presses, similar results are being obtained in this country in plants operating on wet raw materials; and in most of the new mills the large diameter, long kiln, running from 200 to 350 feet, is giving excellent results, many of them even providing in their waste gases sufficient heat to run waste heat boilers.

It is possible that with the development of low temperature distillation of coal, with its valuable by-products of gas and high-value tars, there may be found a way to save these products of distillation and use the coke, thus reducing fuel costs in both the wet and the dry processes. One of the drawbacks so far to low temperature distillation is the great initial cost of the plant, but of late much progress has been made in the way of reducing this element. In the dry process of cement, there seems to be little doubt but that it is only a question of time when the high temperature gases going off from the clinkering operation will find new and more advantageous uses than those now practiced.

As far as grinding is concerned, it seems almost a miracle to look at the enormous apparatus in single units used for this operation, when one remembers the small coffee-mill crushers and millstones which the first portland cement mills in our country used. With the increasing demand for the finer grinding of portland cement, this side of the industry is attracting attention; and the future certainly has in store still greater units, with greater power and concentration of effort and a finer character of output.

Administration and Selling

With the growth of great industrial consolidations and mergers, accounting is becoming more and more a vital element of business; and the cement industry is fortunate in having had since its early days a cost sheet scientifically prepared, which is used in a large percentage of its plants. By it the cost of production in all its elements is carefully watched and distributed, thus enabling the administration to know the actual results of its business and to meet "the new competition" of industry against industry with good judgment and solid knowledge.

Tariff

It is likely that in the next session of Congress we shall hear much of tariff, and especially tariff on cement. While the amount of cement imported may seem small when compared with the amount manufactured in our country, it must not be forgotten that this foreign material is all delivered at points along the seacoast; and while seem-

(Continued on page 128)

Cement "Grows Up"

By R. R. COGHLAN

Co-Author, "Power Plant and Kiln Design and Operation" articles in CONCRETE in 1926 and 1927
Chemical Engineer, Southwestern Portland Cement Co.,
Los Angeles, Calif.

PORTLAND cement has experienced a long childhood and is now entering a period of adolescence. Indications are that this period will not be nearly so prolonged and that on completion there will be two or more grades of portland cement, each with specific uses, rather than one grade for all uses. Such an idea is distasteful to the conservative minds of the industry who are powerless before the growing demand originating from the consuming public. The tempo of American financial and industrial life has been quickened since the World war and competition is keener than at any previous time.

Timber, stone, brick and steel may be classed as practically finished structural materials. Their use occasions no delay other than the time consumed in fabricating them into a finished structure. Cement, due to the chemical processes involved in the conversion of a mixture of sand and gravel-plus water-into hardened concrete of sufficient strength to permit further construction, has coupled with it a time element, the effect of temperature and many other variables to be reckoned with when the proper factor of safety is considered. It is true, that from the vast amount of data accumulated in the study of the average cement in concrete, the time factor which is safe can be determined with some exactitude.

The novelty of portland cement has worn off. Why cement displays its wonderful ability to harden as it does no longer intrigues the practical worker and the questions are raised: Why cannot concrete be put to use as quickly as the other structural materials? Is the delay occasioned by the time required for the concrete to attain safe working strength necessary? Such questions have been frequent in the past ten years and as a result the quiet childhood of the industry has passed into a rather turbulent adolescence. Research within and without the industry has been stimulated. The conservatives have placed before the public all of the virtues of the standard portland cement. Their investigative work has been monumental and has resulted in a marked improvement in the quality of concrete as it has unlocked many of the principals which govern the correct use of cement in concrete.

Recent Improvements

It is manifestly unfair to leave the impression that no attempt has been made to improve the quality of portland cement. Improvements of machinery and refinements of operation necessitated by the increased cost of labor and materials, as well as the stimulus of competition, have all tended to bring about a marked improvement in the quality of the standard cements. Concrete of any desired strength at any predetermined period can be produced from standard cement by following the methods developed by the Portland Cement Association laboratories. Many construction jobs have been completed in record time by following these methods, but after all the fact remains that they have required more cement than for the usual grade of concrete, longer mixing time, more sacks to handle to the mixer and return to the dealer, more job storage and more labor cost. With these facts in mind it is small wonder that the users of high early strength cement are more than pleased with it. Even at a slight increase in cost over standard grades of cement it shows a material saving in the cost of a cubic yard of concrete and makes the pouring an almost continuous process. Cement developing over a thousand pounds per square inch at the end of twelve hours—using the average contractor's mix—limits the amount of concrete which can be placed to the strength of the retaining forms. Unsightly and doubtful bonding between successive batches from one day to the next are eliminated. The high early strength cements are here to stay and their field of usefulness is constantly expanding.

Standard portland cement will always maintain a strong position in the material field. It has too fine a background of achievement back of it to be abandoned; but marketing conditions are such that the manufacturers without a high early strength cement as well as the standard grade are going to feel the tightening of their sales territories. Mixed carloads are attractive to the dealer. This method of marketing allows the manufacturer of two products to gain advantage over his competitor with one product.

The border region between standard and high early strength cement is so narrow that it is not impossible of bridging for the majority of the producers. More careful handling of raw materials, more rigid chemical control, thorough burning of the clinker, and careful blending and handling of the finished cement produce a marked betterment of quality. Slight changes of chemical composition and the use of certain mineral catlyzers are sometimes indicated. At any rate each plant presents a solvable problem and the will to make such cement is all that is required. Invariably improvements in equipment, new materials and methods have greater initial cost but

There is usually, in the history of any industry, a period of pioneering when the basic idea underlying a new product must be put over.

There has been such a period in the cement industry. During it the use of cement has grown, in spite of the tremendous difficulties that faced the industry. Both in volume and in quality, definite forward strides were taken.

Then came the period during which the volume of production grew by leaps and bounds and competition became keener and keener. Not only is there competition among cement manufacturers, but other building materials as groups are allied against the cement industry.

In the face of such a condition it seems certain that further developments may be expected. Mr. Coghlan has some definite ideas regarding the direction these developments are taking. He tells about them in this article.

at the same time they are offset by marked economies of operation. Even with increased production costs such cements can be sold at a profit to the manufacturer and a distinct saving to the user.

Plastic Cements

Another problem comes to vex the manufacturers of standard and high early strength cements. This is the increasing production of the so-called plastic cements by the producers of the other grades of cement. Here the selling of mixed cars acts against those manufacturers who are not producing a plastic cement. To date research on portland cement has not developed methods for producing within the cement itself the property of imparting the same degree of workability to mortars that some of the plastic cements possess. We have been more concerned with establishing the composition of those compounds occurring in the clinker at equilibrium, the effect of varying their amounts, the production of strength. changes of volume in the set cement, etc. Meanwhile the producers of other materials have been studying the effect of their admixtures on the workability of concrete. The cement manufacturer is offered all varieties of diatomaceous earth, ground clays, bentonite, hydrated lime, oil bearing materials and various chemical reagents. While each of the admixtures has its merits and produces increased workability of varying degree, the responsibility for its use must rest with the portland cement manufacturers who employ such admixtures. Plasticity must also be coupled with strength, bonding power, water-proofness and permanency of volume. Research on this class of cements has been meager and more along the line of developing methods for measuring workability than with the more pertinent chemical aspects of such admixtures. Their sale has been almost entirely on the opinion of the plasterer and is not based on much scientific data. An untried field, it has been thrust upon the portland cement industry because portland cement is the major constituent of all these cements, giving them the necessary strength. It is an unfortunate situation for the industry and must be met.

The sooner the spectacular is removed from the industry, the better it will be for all. Specifications are needed for these three types of cement, but specifications are useless without adequate test methods for their proving. Instruments and methods for proving the vague property defined as plasticity, workability, flowability, etc., are in an experimental stage, so far as cement mortars are concerned. The present methods for testing cement are far from satisfactory. Work is being done in all these lines and out of the chaos may emerge sets of standards that will bring stability to the present adolescent era and put the industry on the former basis of service to the customer.

Oregon Manufacturers' Work Effective in Barring Foreign Product from Structure

Last minute withdrawal of the specifications for a viaduct construction and their changing to call for exclusive use of American cement, was effected recently by Multnomah County, (Oregon) officials following conferences with Oregon cement manufacturers.

The county made no requirement in the original specifications as to whether foreign or domestic cement was to be used. The chairman of the board declared that that body had intended to limit the bidding to domestic cement, but that an error had been made in the specifications.

Oregon manufacturers contended and have done so frequently in the past that as domestic manufacturers they are entitled to consideration under provisions of the law which makes it mandatory on the part of public bodies to use domestic products when the bid on foreign products is not more than 5 per cent under that on local products. Shipping interests and port officials argue that ships coming into Portland from Belgium bring cement as ballast and that without ballast which pays a revenue they would not call there for lumber and wheat.

Superior Holds Safety Rally to Start Off New Year

To create and retain interest in 1929 safety work, Superior Portland Cement, Incorporated, Concrete, Washington, held a safety rally at the local high school on December 8th under the auspices of the safety committee of the company. Community signing and the reading of prize-winning essays on "Safety in the Cement Industry" were a part of the program. The essay papers were those written by school children and submitted in a contest sponsored by the company.

Jas. H. Kane of Seattle, a director of the firm, also spoke, on "The Value of Safety," referring largely to the record made by the Superior company and giving a few figures in regard to the accident record previous to the safety movement and the steady improvement shown since.

French Cement Firm Interested in New African Company

Henri Chausson, managing director of the French cement producers, Societe Anomyne des Etablissements Poliet et Chausson, is founder and director of the newly incorporated Union Industrielle Africaine, which will supply the French colonies in Africa with cement and other building materials. The new company is capitalized at 1,000,000 francs.

Canada Consolidates with Gypsum Company

The Canada Cement Company, Limited, and the Atlantic Gypsum Products Company have effected a consolidation of gypsum quarry operations. All of the Nova Scotia crude gypsum rock used by the two companies is to be produced at the Atlantic Gypsum Company's Eastern Canadian plant.

Monolith Dividend

The regular semi-annual dividend on the basis of 8 per cent annually was paid to preferred stockholders of the Monolith Portland Cement Company in January. Common stockholders also received a dividend of like amount.

An annual stockholders' meeting was to have been held January 15th and another for those of the Monolith Portland Midwest Company on January 25th, at Los Angeles, Calif.

Lehigh Dividend

The Lehigh Portland Cement Company in its report for the year ended November 30th, shows a net income of $4,124,390, after depreciation, taxes, etc. This is equivalent to $5.75 a share earned on 450,348 shares of common stock, comparing with $5.64 a share in the preceding fiscal year.

Forcing Progressive Policies

By EDWIN C. ECKEL
Author, "Cements, Limes, and Plasters"
Co-Author, "Portland Cement, Slag Cements, Alumina Cements, and High Strength Portlands"
Mining and Engineering Geologist
Washington, D. C.

It is sometimes difficult to appreciate that developments entirely outside an industry may affect that industry very emphatically.

When color came into common favor, hardly an industry escaped its influence, and in some industries fundamental changes were necessary.

Industry can no longer hold itself aloof from "foreign entanglements."

Nor can the cement industry ignore changes in the political, social and economic worlds. In this rapidly changing world many events may be of importance to the cement industry. None should be dismissed without examining its possible effects.

In the following article Mr. Eckel looks at the cement industry from this point of view.

FURTHER increase in output for purely United States consumption will depend necessarily upon the course of general business.

But the incoming administration will apparently be marked by a definite attempt to develop Pan-American relations, physically, commercially and politically. Within the next four years we will see the commencement of the second inter-oceanic canal across Nicaragua, of a line of north-south highways, and of numerous port developments.

All these will imply heavily increased consumption of cement in Latin America; and a fair proportion of this should come from the United States or at least United States-owned mills. For an obvious development of the near future should be the construction of mills in Central and South America; and at least some of these will be operated as subsidiaries of North American companies.

The most marked feature of the continent of South America, as contrasted with Europe and North America, is the extreme scarcity of coal fields of normal type. That fact will condition cement manufacturing in South America, and its early recognition will mean the difference between failure and success. Except at a few possible locations, we should expect to see oil or producer gas used as fuel when the rotary kiln is employed; while there are some good market areas where vertical kilns, blast furnaces and electric furnaces may easily prove more economical than the rotary.

Grades and Specifications

In every foreign country the obvious tendency is toward more stringent specifications for the highest class of cement in use. As a matter of trade policy it is easier to meet these higher specifications than to have to admit that one is making and selling a "second class" cement.

So I assume that the American portland cement industry, after the usual protracted struggle with the ultra-conservatives, will adopt the progressive policy of making a high-grade cement and of helping in the adoption of high-grade specifications.

The Nicaragua Canal alone will force and determine this issue. No engineer will use anything but the best obtainable cement on a job of that importance.

And it must be borne in mind here that the use of the word "best" does not refer merely to high strengths or to high early strengths, but to properties which for important works are far more serious. The bulk of the construction in South and Central America is subjected to physical and climatic conditions which will inevitably bring into the foreground the whole question of cement resistance to solution under natural conditions. Since a failure will be spectacular at the best and disastrous at the worst, we may assume that engineers, as distinct from manufacturers' agents, will study the entire problem anew.

Improved Processes

In making better portlands, for a time the tendency will be toward wet processes and rotary kilns. But I do not think that in the long run rotaries run on wet mixes will be the answer to the problem.

In my judgment something more economical as to fuel will be developed. There seem to be two obvious alternatives, one of which is now used in a small way, while the other will be operated in 1929. The first possibility is the use of the normal blast furnace, fusing a mixture of unground raw materials. The second possibility is the use of a modified blast furnace, clinkering a mixture of finely ground raw material. In either case the fuel consumption of the rotary is cut in half—and some other costs with it.

As to the source of such new processes, patriotism might incline us to suggest that they are likely to originate in America, but economic history points out that the contrary is more likely. The following summary of the chief process improvements in two great industries is of service in checking over-enthusiasm on that subject:

Process or improvement	Invented in Europe	Adopted in U.S.A.	Drag, years
Coke first used in blast furnace	England, 1735	1837	102
Coke generally adopted	England, 1780	1865	85
Puddling process introduced	England, 1783	1817	34
Rolls used in iron industry	England, 1783	1817	34
Hot blast adopted	England, 1828	1834	6
Crucible steel made	England, 1740	1832	92
Bessemer process used (acid)	England, 1855	1864	9
Basic Bessemer process	England, 1877	not yet	+52
Open hearth process	Europe, 1862	1868	6
Natural cements made first	Europe, 1798	1819	21
Portland cement made first	England, 1825	1875	50
Alumina cement made first	France, 1906	1923	17
High alumina portlands made	Germany, 1908	not yet	+21
High speed portlands made	Switzerland, 1913	1922	9

Even a casual inspection of this tabulation will suggest that however inventive and shrewd the Yankee may be in popular esteem, in real life he does not invent new processes, and does not even steal them very promptly. So in the future, as in the past, it will be well to look to Europe for advances in technology, insofar as entirely new processes are concerned. The fourteen processes above listed show that the "drag" or delay in accepting new ideas was on the average 38½ years. It is to be hoped that, with better communications, we can improve on that record in future. And we have at least the consolation that the cement industry was almost twice as clever as the iron industry; its average mental retardation was only 23½ years.

Special and New Cements

There are a great many purposes for which special qualities are required—ranging from demands for intense hardening speed to requirements for intense chemical resistance. It is folly to think that any one product can be used for all engineering necessities. So that there is obviously a very large field—some twenty million barrels annually in the United States alone—where something different from a normal portland will better suit the requirements. That is the field for special cements.

For occupation of this field I have suggested that two products would fill most requirements. One, alumina cement made by some intelligent and economical process and sold at reasonable prices; the second, a portland-puzzolan mixture of one sort or another, mixed and ground together at the mill, and sold under proper guarantees.

Foreign Competition

The United States market can be protected from foreign competition by tariffs; but in Latin America foreign and American cements will meet in a fair field. And in that market, whose importance in the next decade is apt to be increasing rapidly, American companies must be prepared to supply better cements than the foreigners, or else accept lower prices. Merely as a business matter there seems to be only one intelligent way out of that situation.

Bankers Predict Future Mergers In Cement Field

Following a study of the cement industry as a field for investment, Wood, Struthers & Company, New York investment bankers, forsee future consolidations of cement companies in the United States in order to bring greater economies of operation and greater profits to investors.

The report points out that at present there is no one company that has more than twenty plants or produces more than 12 per cent of the total output. The combined production of the six largest companies is said not to equal even half of the total. Some conception of the possibilities in this direction may be visualized by comparing this situation with that obtaining in the steel, electrical or motor industries, it is pointed out.

The report concludes that while foreign competition in recent years has retarded the progress of cement companies operating along the Atlantic seaboard, it appears that the American cement industry can look to the future with some hope that the tariff will be adjusted.

Cement Statistics in Middle West for 1928

According to the Kansas City Cement Bureau, serving western Missouri, Nebraska, Kansas, Arkansas, Oklahoma and the Texas Panhandle, the mills located in the Bureau territory shipped into same during 1928 approximately 8,780,000 barrels of portland cement, as compared with approximately 8,918,000 in 1927.

At the close of 1928, these mills had approximately 1,338,000 barrels of finished portland cement on hand, as compared with approximately 1,625,000 at the close of 1927.

Of the total shipment by these mills into Bureau territory in 1928, approximately 1,865,000 barrels were furnished for contract work, the balance to the general retail trade; and at the close of the year, unshipped commitments were substantially less than those carried over from 1927.

The total production of these mills for 1928 was approximately 10,930,000 barrels of finished portland cement, a substantial increase over 1927, but finding an outlet in shipments outside the Bureau territory.

Twelfth Chemical Industries Exposition Announced

The Twelfth Exposition of Chemical Industries will be held at the Grand Central Palace, New York City, the week of May 6th to 11th, 1929.

The exposition draws together chemists, engineers, manufacturers and others interested from forty industries which are dependent in their operations upon a chemical change in the nature of the material or are under chemical control.

Yosemite Increases Stock Issuance

The Yosemite Portland Cement Corporation of Fresno, California, has been given authority to amend a previous order of the state corporation department to permit of the sale of 1,000 shares of Class "B" stock to George A. Fisher at $5 a share. Proceeds will be used for promotional services.

The firm, capitalized at 250,000 shares of class "A" and 150,000 shares of class "B" stocks, both of $10 parity, had been authorized to issue its entire class "B" stock to provide promotional funds.

French Cement Company Changes Name; Increases Capital

The Societe Financiere des Ciments has changed its name to that of the Compagnie Internatione des Ciments and increased its capital from 1,875,000 to 10,000,000 francs.

Pacific Portland Opens New Quarry Near San Juan Plant

The Pacific Portland Cement Company has opened a new quarry in the Gabilan hills behind its plant at San Juan and a railroad five miles long has been built to it. The deposit is at an elevation of 1850 ft. causing the road to hug the hills at a steady upgrade. An eighteen to twenty years' supply of rock is available at this point.

Million Dollar Nevada Plant

The Nevada Lime and Rock Products Company, with a plant at Sloan, Nevada, is said to be considering the construction of a $1,000,000 cement mill at that location. Tests have been made and the raw material pronounced suitable.

Lehigh Dividend

The Lehigh Portland Cement Co., Allentown, Pa., has declared the regular quarterly dividend of $1.75 on its preferred stock, payable April 1st to stock of record March 14th.

Tomorrow's Cement Plant

By RAY C. NEWHOUSE
Chief Engineer, Crushing and Cement Machinery Division
Allis-Chalmers Company, Milwaukee, Wis.
Formerly Chief Engineer, Cowham Engineering Company, Chicago

Will tomorrow's cement plant be radically different from the cement plant of today?

Or will it be much like present plants except for those improvements which will permit better chemical control, greater savings in labor, fuel and power, etc.?

There are differences of opinion on this question, naturally.

In the following article, Ray C. Newhouse presents his analysis of the question and gives his reasons for the opinions he holds.

JUDGING by our experience of the past, there is little apparent reason to believe that the cement plant of tomorrow will differ materially from that of today, except for those improvements which will give the chemist better control of the mix and enable the operator to effect savings in labor, fuel and power, greater attention than ever before being paid to the safety of the workmen.

We may expect to see an increased use of blending bins in dry process and improved slurry agitating and correcting tanks in wet process plants. It should be noted, however, that such devices, while desirable, are only a means to correct a fault in the original mix. The ideal mix is that which requires no correction, and no system of subsequent mixing has been devised which is equal to a tube mill or compartment mill, *preceded* by dependable proportioning devices, for producing "an intimate and properly proportioned mixture of argillaceous and calcareous materials." For that reason, blending bins and correction tanks should be used only to correct minor fluctuations in the mix.

Crushing Department

The beginning of the cement plant proper is generally considered the rock crushing department. In the way of preliminary crushers, there has been little change during the past ten years except for improved mechanical details, and, for the greater number of installations, we may expect to see the continued use of gyratory crushers and single roll crushers of the Fairmount type, with an occasional jaw crusher or large hammer mill. Improvements in secondary gyratory crushers, especially in the way of a much higher speed crushing action, will simplify the crushing plant, and we may expect to see the continued use of improved gyratory crushers for this secondary stage of reduction. Hammer mills will also be used for non-abrasive materials and sometimes for abrasive materials where first cost is of greater consideration than cost of repairs.

Improvements in grinding machinery during the past two years naturally lead one to hope for continued improvement in the future. By far the greater number of plants constructed during the past few years have installed compartment mills. The old argument of one stage grinding, used against the compartment mill, never was a correct one, and many compartment mills are being installed today where three and four stage grinding is used. In fact, this development in compartment mills will naturally lead to two stage grinding in tube mills. The early compartment mills had no efficient sizing device between the first and second compartment. A small percentage of relatively large particles delivered to the second compartment, necessitated the use of relatively large balls for the entire length of the mill beyond the preliminary ball chamber to prevent the discharge of material larger than 30-mesh from the end of the mill. Recent improvements in screening devices at the end of the ball compartment have made it possible to deliver an approximately 16-mesh product to the secondary chamber, permitting the use of at least two subsequent grinding chambers with very small grinding media in the last chamber, delivering a product entirely free from coarse particles. On the principle that a sledge should not be used to drive tacks or a tack hammer to drive spikes, this adds to the grinding efficiency. We may expect to see an increased number of grinding chambers in future grinding mills, the size of grinding media in each chamber being properly proportioned to the work to be done. One three-compartment mill is operating today with a screen on the preliminary ball chamber returning rejects to the middle of that chamber. The second chamber runs in closed circuit with an air separator, which returns the oversize to feed end of the second chamber and delivers the fines to the third compartment, which runs in open circuit to produce the "flour" so necessary to high grade portland cement. The delivery of a uniformly sized feed to the last compartment permits the use in that compartment of very small grinding media with consequent high efficiency.

Much study is being given today to the question, both as regards raw material and the finished cement, "What is the optimum sized particle." Eliminating the cost of producing it, the optimum size for the raw material would seem to be the original molecule. Since, however, extremely fine grinding demands an excess of power and the use of much machinery, it is probable, in the writer's opinion, that the optimum size will be the highest possible proportion of approximately 400-mesh material with the smallest possible percentage of plus 200-mesh material. Such a product would undoubtedly contain sufficient material of from one to three micron size to start the flux in the kiln. Since the temperature in the kiln will be that required to combine the largest particle, the elimination of plus 200-mesh is more desirable than the production of a large number of extremely fine particles. The production of such material can be produced only by closed circuit grinding. Unfortunately no dry classifier has been produced which will act efficiently for so fine a separation, and, on account of the difference in specific gravity between air and cement forming materials, we can never expect a highly efficient device. It is probable, however, that improvements in air separators and their application to an intermediate stage of the grinding will permit us to deliver a better kiln feed than we are now obtaining, without increased cost.

Classifiers in "Wet" Plants

For closed circuit grinding in wet process plants, the mining industry has provided us with classifiers which are more efficient than any that we can expect ever to produce for dry grinding. While local conditions will always dictate that some plants should be dry process and others wet process, there seems to be no reason why, in those wet process plants equipped with filters, closed circuit grinding should not be employed. In existing plants, the use of filters permits the use of higher moisture in the slurry than would be considered economical where filters are not used. This alone adds to the grinding efficiency on account of the excess water carrying forward the fine material, leaving the more granular material behind. This resembles closed circuit grinding, and increases the capacity of the mill. Since it is possible, with gravity thickeners, to deliver a product sufficiently low in moisture to decrease but little the capacity of filters on normal slurry, we may expect to see the use of classifiers in wet grinding cement plants of the future. We must bear in mind, however, that we cannot expect the enormous increase in capacity obtained in the mining industry by high circulating loads, since our desideratum is not material which will just pass the 200-mesh screen, but something much finer.

Size of Particles

In the grinding of the clinker into finished cement, we are confronted with a more serious problem when seeking the optimum sized particle. In forming the chemical combination in the kiln, we need some extremely fine particles to start the flux. In the cement, there is no great advantage in having a portion of the particles hydrate in advance of the others. By any known method of grinding, it is impossible to produce particles all of one size, hence there is a difference in time between the intial set and the final set: if any chemist were to find that the initial and final sets were simultaneous, he would naturally conclude that there was something wrong with the cement, and would report the final set "flash." However, if every particle were of exactly the same size, the hydration would take place at the same time. Since, however, the rate of hydration and consequently the time of hardening varies inversely as the area of the surface of the particles produced, the more finely ground the cement, the more quickly the final set takes place. Since the concrete has no material strength before the final hydration of the larger particles and since the production of a large number of extremely small particles may produce too early an initial set, the desideratum seems to be the production of a cement containing practically all particles of relatively small size with a minimum number of particles of 5 micron size and smaller. Since such a product is impossible with open circuit grinding, let us hope that, since "Necessity is the mother of invention," some method may be evolved which will permit us to eliminate the approximately 200-mesh material without the production of a large percentage of minus five micron material, which not only entails the use of excessive power, but may be objectionable, as will be referred to later.

Improvements to Kilns

While we may hope for improved grinding efficiency, past developments indicate that we may more reasonably expect an earlier improvement in the kiln department. The principal heat losses from a rotary kiln are loss of heat in the clinker, radiation and loss of heat carried out by the stack gases. Up to the present, the most practicable way to reduce stack gas temperatures is the use of waste heat boilers, but where power may be purchased so cheaply that the capital expenditure for a waste heat boiler plant is not justified, improved efficiency must be obtained in the kiln itself. Several schemes have been proposed and are in use, such as spray injection of the slurry, long kilns, and heat transfer devices in the upper end of the kilns. It is the writer's opinion that some kilns have already reached or exceeded the economical length. While, within limits, it is assumed that capacity varies with the volumetric contents, this is not true of extremely long kilns. For a given volume of kiln, it is probable that better efficiency may be obtained with a kiln of large diameter and moderate length than with a kiln of smaller diameter and extreme length. One of the heavy heat losses in a kiln is caused by radiation, and, since the capacity of a kiln varies as the square of the diameter and the radiation losses directly with the diameter, the advantages of a large kiln are apparent. In addition, since the capacity of a kiln does not vary directly with its length, the increased power required and the additional capital expenditure may not be offset by increased fuel economy. Existing installations of kilns of large diameter and moderate length compared with smaller kilns of great length seem to show a lower fuel consumption with higher capacity per dollar of capital expenditure for the former.

The diameter of kilns is naturally controlled by shipping limits and the difficulty of retaining the lining in place. Experience has demonstrated that it is not possible to maintain a lining much, if any, thicker than 6 in. in the fusion zone of a rotary kiln. This, combined with shipping clearances has tended to limit the diameter of the principal parts of rotary kilns to 11 ft. 3 in. or 11 ft. 6 in. in diameter, although several kilns are operating in America 12 ft. in diameter for the entire length. This limitation in regard to lining does not, however, apply to the calcining zone, and one American kiln is operating today 11 ft. 6 in. diameter with a 15 ft. diameter calcining zone. The advantage of the enlarged calcining zone is increased fuel economy, with a more uniformly burned clinker. This enlarged zone provides a soaking pit which thoroughly calcines the material before it reaches the fusion zone. In the production of high grade portland cement, it is desirable that thorough calcination take place before the material reaches the fusion temperature, and it is probable that additional means will be devised to insure that this takes place.

Effective cooling of the clinker is desirable, not only to save the sensible heat contained therein, but because quickly cooled clinker is more easily ground and produces higher strength cement. We may therefore expect improvements in coolers in the next few years.

No prediction regarding the future cement plant would be complete without some reference to "high early strength cement." Fortunately the greater part of the high early strength cements are normal portland cement produced by fine grinding of the raw material, enabling the burning of a high lime ratio cement, followed by extremely fine grinding of the finished cement. While there is a legitimate demand for such cements in certain classes of work, it seems that the present state of the industry does not demand that such cements be used universally. For example, a heavy concrete dam can be built with normal portland cement meeting the A. S. T. M. specifications, which will develop its full strength before any considerable pressure is produced. The fact that finely ground cement is more affected by moisture in the atmosphere than normal cements, makes it desirable that a better package be produced to protect these cements. The fine grinding of these high early strength cements causes the cement to leave the grinding mills and to be shipped at a higher temperature than is desirable, but the cooling of such cements should not be carried to too low a temperature, as a high temperature in the car produces a relatively low humidity, with the result that the air has a greater affinity for the moisture than the cement. The ideal to be sought appears to be a cement which contains little plus 200-mesh material, as that is almost inactive, and a large proportion of particles from five to twenty-five microns diameter; the particles smaller than five microns diameter requiring a larger amount of power than is justified by the benefits obtained by their presence. Unfortunately, there is no known method for commercially classifying particles so small as five microns. Where properly protected against moisture, the only known objection to particles smaller than five microns in a normal setting cement is the expense of producing them.

German and American Tests

In comparing early strengths of American cements with reported tests of European cements, undue credit is liable to be given the latter on account of the difference in the method of testing. Twenty-four and forty-eight-hour breaks of briquettes made by the German method may show 75 per cent higher strengths than briquettes made from the same cement by A. S. T. M. methods, while seven and twenty-eight day breaks may show only 10 per cent greater strengths for the German methods when compared with the American.*

The demand for machinery to produce high early strength cement has led to the improvement of design of grinding machinery in this country to a point where it is highly efficient. American made cement machinery can be obtained which is superior to any foreign made machinery. This improvement in design will be a benefit not only in the production of high early strength cements, but also in cements for normal requirements. As one would naturally expect, the largest grinding units in the world are American-made, for American factories. Mills are now operating having capacities considerably in excess of five thousand barrels of cement per day when grinding to standard American specifications.

The research which has been and is being carried on by the Portland Cement Association, regarding the proper manufacture and use of cement, gives reasonable assurance that we may have confidence in its slogan "Concrete for Permanence."

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*Since the writing of this article, a test has been made of a standard American portland cement meeting all specifications for soundness, setting time, 7- and 28-day breaks and a fineness of more than 85 per cent through 200 mesh. Tested by the German method standard three-to-one sand test, this cement showed a tensile strength of 150 lbs. per square inch in 24 hours. The same cement, tested at the same time by the American method three-to-one sand test, showed a tensile strength of only 46 lbs. per square inch. In making these tests, the German method was followed closely, including the use of German testing sand, and a determination made for normal consistency by the German method. The percentage of water, however, was the same as determined by the American method.

International Contracts for Tank Steamer

It is reported that a newspaper published in Copenhagen carries an item purporting to be an interview with Hugh Struckmann, president of the International Cement Corporation of New York, who spent Christmas in Copenhagen. He is reported to have said he just signed a contract with a Danish ship building concern for the building of a tank steamer, or motor ship, of approximately 2000 tons dead weight.

This ship is intended for use by the International mill at Mariel Bay, Cuba, and will have seven tanks for cement. It should be able to discharge its full cargo in about two hours.

It is stated that this ship will be used for Cuban trade and also for supplying ports on the Mexican Gulf.

Governor's Message Due on Michigan State Plant

A special message by Governor Fred W. Green regarding the state-owned cement plant at Chelsea, Michigan, is being awaited by the legislature.

A comprehensive report regarding the plant has been received by the governor from John W. Miner, of Jackson, a member of the State Prison Commission, and Chas. D. Frasier, superintendent of construction at the Michigan State Prison. This report covers not only the physical condition of the plant but also its desirability as a place of employment for the inmates of the institution.

Governor Green's message will be based partly on the report and partly on his observations as to the value of the plant to the state highway department. Otherwise its nature has not been indicated.

National Lime & Cement Co. Buys Alabama Property for Plant

The National Lime, Cement & Byproduct Corporation has purchased 300 acres of land near Sheffield, Ala., and will soon commence work on the erection of a $300,000 plant for the manufacture of cement, lime and other stone products.

The National Lime, Cement & Byproducts Corporation have their main offices in Buffalo, N. Y. Thomas K. Morris, engineer, is vice-president and production manager of the corporation. The name of the president has not been made known.

Expect to Complete Idaho Plant by Spring

The Idaho Portland Cement Company expects to have the new plant it is constructing near Inkom, Idaho, ready for operation early in the spring.

Since beginning construction in September, a half-mile spur, a bridge across the Portneuf river, and a power line have been built or extended, in addition to considerable progress on the plant itself.

(Continued from page 120)

ingly affecting only a small area, it nevertheless does affect prices almost all over the country. The best illustration of this is shown in the history of the cement industry at the time of the great San Francisco earthquake and fire. When all the Pacific Coast mills were unable to supply the demand for cement, the Rocky Mountain mills filled up the gap; and their shortage was made up from shipments from the Kansas field, while the shortage in the Kansas field was helped by the LaSalle and St. Louis district mills, and so on all over the country, until the eastern mills were supplying cement far in the interior, out of their normal territory. Reversing this process, the foreign cement discharged at seaboard, made with cheap labor and brought into our country in many cases as ballast and sold at low prices, drives the output of the mills supplying the seaboard market out of their normal territory and tends them to find trade farther inland, thus driving inland mills to seek their markets farther away, until the whole fabric of the industry is disturbed, and in some cases even causing the closing of mills, to the loss of labor and owners, as well as to the labor in the coal industry, the cotton bag industry and the machinery industry, all of which furnish large amounts of material used in making cement.

In the face of the improvement and rebuilding of many of the older mills and the construction of a number of new mills, the latest figures, according to the United States Bureau of Mines, Department of Commerce, for the year 1928, which show shipments of 170,922,000 barrels, are discouraging in connection with those of preceding years, and in fact show the smallest increase in shipments since the end of the World War and the financial readjustments after the year 1921. The increases year by year were as follows:

	Per Cent
1922 over 1921	23+
1923 over 1922	15+
1924 over 1923	7+
1925 over 1924	7+
1926 over 1925	3+
1927 over 1926	5+
1928 over 1927	2+

With the expansion of the country and the vastly increased uses for portland cement, as well as all the new uses that are likely to be brought about, the above figures indicate how important it is for the industry, working through its co-operative field of research, engineering and publicity—the Portland Cement Association—and working in its individual capacity in the various companies doing business, to continue to devote its time and energy broadening the field of the demand for cement and meeting "the new competition" between industry and industry with courage, strength and vigor.

Pacific Coast Cement Company Goes Into Operation

The accompanying photograph was taken on December 26th when the Seattle plant of the Pacific Coast Cement Company was put into initial operation and shows N. D. Moore, vice-president, in the role of stoker, as well as Plant Manager W. H. Green. Darwin Meisnest, assistant sales manager, Wylie Hemphill, vice-president and sales manager, are seen standing behind S. E. Hutton, engineer and designer of the plant..

Portland Cement—A Look Into the Future

By C. H. SONNTAG
Consulting Engineer,
Sandusky, Ohio

Two influences are at work, modifying the trend in portland cement manufacture, says Mr. Sonntag.

One is the desire of manufacturers who make a superior product to sell it on its distinctive merits.

The other is a changing demand on the part of the cement user.

These influences cannot help but have their effects on manufacturing processes. What these effects will be is a matter upon which there is difference of opinion. Mr. Sonntag's opinions and his reasons for them are given in the following article.

EVER since the establishment of the standard specifications for portland cement, this really wonderful material has been offered on the market as a thing of substantially uniform worth, regardless of who made it or where it was made. Two influences are at work to disturb this state of near-stagnation—one, the desire of those manufacturers who can make a distinctly superior product to sell it on its individual merits; the other, the demand of engineers and the consuming public for a cement that will let them get their work done more quickly than is possible with the standard portland.

The high early strength portland is one answer to this demand. It will develop as high strength in a week as the older cement would acquire in a month. It does not need the addition of an accelerator to hasten hardening. Although made by refinements of older methods, its production is not possible in many of the older mills without prohibitive remodeling. Other cements sold under trade-marked names and made by more extensive modifications of or additions to the older processes are also finding a place in the market to satisfy the demand for early strength.

Kiln Efficiency

The rotary kiln is still an integral part of all these manufacturing methods. It is notoriously inefficient in its utilization of heat. It requires that the raw materials be fed to it finely ground and thoroughly mixed. It can not burn solid fuel in large pieces.

Everything that is done in the rotary kiln could be done better if it were possible to bring the raw materials to complete fusion, keeping a sufficient volume melted so that thorough mixing could take place. The iron industry offers us, in the blast furnace, a device fairly well adapted for the fusion. It is already turning out vast quantities of slag as a by-product of making pig iron. It is true that the melting point of this slag is lower than that of portland cement clinker, and its composition is not the same, and it is true also that the blast furnace, as at present constructed, is not capable of being run at the high temperature needed to produce molten cement clinker. Again, it is true that the only commercial fuel for a blast furnace is coke, which is at present too costly in most parts of the country.

Someone is going to find out how to run a blast furnace at a higher temperature than can now be done, either by using hotter blast, or oxygen-enriched blast, or by some means not now known. Coal technologists tell us that the time is approaching when most coal will be processed, which means coke manufacture on a far larger scale than at present and in more widely scattered units.

A Changed Plant

When these things come about, is it too much to expect that a cement plant will consist of a crusher, a blast furnace fed with lump raw material and coke, and a clinker-grinding mill with units possibly not much different from the present ones except for size? A blast furnace gives off large quantities of combustible gas, which can be burned under boilers and give power for blowing the furnace and grinding the clinker.

It may be found necessary in the interest of uniformity to hold a considerable amount of clinker in the molten condition after it has left the furnace. For this some such device as the Jones mixer, long used to average up the molten metal from the iron blast furnace, could be used.

Complete fusion will mean complete reaction between the constituents of the clinker. Hence it should be possible to bring the composition of cement still more closely to that of tri-calcium silicate than we can now do.

Does this all sound like pure speculation? Well, perhaps it is, but the Bessemer converter was once laughed at, and the first rotary kiln was not successful.

The foregoing does not refer to alumina cement, which so far has found but limited application in this country. It is now made in blast furnaces in Europe, and it is likely that manufacture along this line may be taken up here. Its distribution will probably always be hampered by the fact that suitable deposits of bauxite or other aluminous ores are not nearly as universally distributed as are those of true portland cement materials.

The wooden barrel is a thing of the past. The cloth bag ought to be also for many sales. But it is retained often through the inertia of habit, and it will continue to be used until the consumer is shown that he can save money by buying in paper or bulk. No two jobs are apt to be exactly alike, so that the sale of cement in paper or bulk seems to call for individual job cost analysis. If this is done often enough, a set of standard costs will be arrived at from which it will be possible to predict without much study whether a job should get its cement in cloth, paper or bulk. At present there does not seem to be much public information on this subject.

Truck Deliveries

Our highways are becoming more and more the means of freight transportation by truck, and this way of delivering cement, already in considerable use, will continue to increase. In the case of a mill located in a large adjacent consuming territory, cement can be moved from the plant directly to the job, eliminating handling into and out of railroad cars and possibly warehouse, with final hauling to the job in any event. Dealers in small towns selling in small lots of cement find it cheaper to drive a truck fifteen or twenty miles to the mill rather than stand the burden of handling a full carload into and out of their warehouse, with considerable money tied up in it. Trucks will be developed to handle larger tonnages of cement in bulk, and with similarly designed trailers, will be operated in short trains. This, with the education of the large contractor to use cement in paper or bulk, will be the course of development in cement transportation in the next few years.

Some of the things just spoken of will probably not be realities for some years to come, and perhaps a limitation of our forecast to the coming twelve-month will seem more practical.

High early strength is here, and is going to be with us in a larger way in the next year. Its raw mix must consist of certain elements in certain well-defined proportions, and unless this can be done, high early strength cement can not be made. Some mills are making it, others can do so easily, while still others must go afield for one or more of the raw materials. Some mills will find the cost prohibitive, and will not make the attempt. Plants trying to make this product for the first time must be satisfied with a smaller output, due to the finer grinding required, unless they are willing to modernize their mills and possibly make additions to them. Those who have been satisfied with very light burning must have a change of heart in this respect, for light burning is not conducive to high early strength.

Grinding units for coal are increasing in size, as are those of the combination type for grinding raw materials and clinker. In the latter there is a tendency to add a third partition, making four compartments, so that the sizes of the grinding media may be more exactly graduated to the size of the material being ground. The larger mills call for larger motors, which are always of the synchronous type, direct-coupled to the pinion shaft.

Slurry filters are now in use in several mills, and the number of installations will increase as the good points of filters are more thoroughly demonstrated and their weak ones ironed out.

In some districts power companies are offering lower rates—possibly to offset the restiveness of the cement companies, some of whom have been seriously thinking about waste heat power, and who under the old rates would probably have put in their own power plants during the coming year.

It has long been known that the largest part of the work of the rotary kiln is done in the calcining, rather than in the clinkering zone, this work consisting in driving off the carbon dioxide from the raw material. It follows that if the mix could be held in the calcining zone for a longer time it would be better prepared for clinkering, and might make more efficient use of the heat flowing through the kiln. A kiln is now being put into service that has a calcining zone fifteen feet in diameter, the clinkering zone being about four feet smaller. This is in marked contrast to the bottle-shaped kilns with enlarged clinkering zones that were installed in some numbers about fifteen years ago. Operating data on the new kiln are not available, and are awaited with interest.

Dusty, dirty mills are still with us, but it is now known that such conditions exist because of the lack of will or money to correct them. Every source of dust in a cement plant can be made dustless by a properly designed collector, and the next year should see many such installed.

These are some of the things immediately ahead of us in the cement business. All of them will probably find definite places in the technology of cement making, which at the end of the next year should more than ever deserve its reputation as the largest and best managed non-metallic industry in America.

Canada Cement Company Financial Report

The first annual report of the Canada Cement Company, Ltd., Montreal, Canada, covering the year ended November 30th, shows a net profit of $1,394,873, after depreciation, interest and reserve. This is equivalent after dividends on the $6.50 preferred stock to 5 cents a share on 600,000 no-par shares of common stock.

The balance sheet of the company shows total assets of $49,431,977, compared with $9,187,659 at the close of the previous period.

Question of Indiana State Cement Plant Reopened

A measure calling for the state to build a large cement manufacturing plant in some strategic location and operate it with prison labor has been outlined by an Indiana state senator, although it has not been formally presented.

The project would be designed to "alleviate the crowded conditions of Indiana penal institutions, find a new outlet for prison labor, and enable the state to construct more miles of concrete highways at cheaper prices."

A similar measure was proposed in 1927 and was bitterly opposed by the state highway department.

Miniature Cement Plant Feature Exhibit at Southeastern Road Show

One of the feature exhibits of the Florida Road Builders first show in connection with the sixth annual Florida Good Roads conference to be held in Jacksonville, March 19th to 23rd, will be a miniature of the Florida Portland Cement Company's plant at Tampa.

The miniature plant is an exact duplicate of the manufacturing plant on Hillsborough Bay.

Oregon Moves Into New Office and Warehouse Building

The Oregon Portland Cement Company late in January moved from its quarters in the Wilcox building, Portland, to its own modern office and warehouse building just completed.

The Challenge of Progress

By T. H. ARNOLD
Co-Author, "Power Plant and Kiln Design and Operation" articles in CONCRETE in 1926 and 1927
Formerly Electrical Engineer, Southwestern Portland Cement Company
Youngstown, Ohio

Obsolescence is a vital factor in all industry. Manufacturers in almost every field are realizing that a new conception of this annoying but persistent element in production must be arrived at.

In the cement industry, also, obsolescence must be given a new meaning, if the industry will be able to adjust itself to new demands without unpleasant or even tragic results.

Merely installing a few modern units of equipment will not defeat the operation of economic law. There is a point beyond which more radical steps must be taken.

Some of the influences affecting this phase of operation are discussed in the following article by Mr. Arnold, whom readers will remember as one of the authors of a series of articles on power plant and kiln operation published in this magazine.

CHANGES in an industry are evolutionary rather than revolutionary. The end of the war found the cement industry one of the most thoroughly standardized industries of its magnitude in the country, both in regard to the product and manufacturing methods. At that time, however, certain economic forces began to be noticed which have reacted with constantly increasing pressure till their effect has become quite pronounced at the present time throughout the industry. We may refuse to recognize, divert, combat or otherwise delay the working out of these forces but each year the results show a steady development along those lines which are founded on basic facts. Mistakes have been made in the past, personal opinions have been substituted for facts by those in authority. What has been true of the past will no doubt continue in the future, however American industry has been developed through the substitution of basic facts for tradition and personal opinion.

Among the major forces which are influencing the development of the industry have been the demands for changes of specifications in the physical and chemical qualities of cement. About 1920 the various special cements developed in Europe during the war began to be extensively discussed and developed for the American market. A process was worked out to place the high alumina cement upon the market commercially. About the same time the high calcium cements, the modified portland cements, the fine ground cements and a host of others appeared, each demanding a change in specifications to suit its particular requirements. Probably the standard portland cement will continue to fill the bulk of the requirements but the special cements have made their own demand and this demand will be filled from some plant.

Imports of foreign cements are growing rapidly in some localities. Some of this undoubtedly is in the class of the special cements. However, a considerable quantity is standard cement which may be imported and marketed at lower costs than it can be procured from American mills. This brings squarely before the plants on the seaboard the question, can cement be made under American conditions to compete with the low cost labor conditions of Europe? With the low labor cost of the modern mill the element of transportation cost will be more important.

Overproduction, in that new mills together with the increase in the capacity in the older mills, has made available productive capacity at a greater rate than the market has been able to absorb it, would appear to be a serious evil. This is no doubt accentuated by attempting to maintain in production some plants which have been rendered obsolete by failure to take advantage of modern developments in machinery and equipment or methods to reduce production costs. Changing tendencies in the method of supplying large markets by producing in the vicinity of the market to eliminate freight has had the effect of introducing new capacity which merely shifts production from one mill to another and leaves the old mill with a reduced market.

This tendency of constructing mills within trucking distance of the larger cities to eliminate freight charges has become quite marked. The decentralization of the old cement manufacturing districts removes the equalizing influence of the uniform freight rate from the various mills to a given market. Modern mills designed for low labor and fuel costs located within trucking distance of their market are in a position to offer their product at a more advantageous price than the older mill with the freight haul. As transportation rates increase and as the importance of this portion of the cost of distribution is appreciated this factor will become of increasing importance in the location of new plants.

Mergers and consolidations have occupied the attention of the bankers to a very large extent in the past few years. Every industry has been merged to a greater or lesser extent. Some plants have been merged with beneficial results in the cement industry. No one group of plants has been able to dominate the situation in the industry in recent years. The independent nature of the various companies has really been a source of strength in the past. In planning consolidations it should be thoroughly understood that merely throwing several obsolete plants under one management cannot be expected to work a miracle and produce a profit. The only operating costs which are affected by the merger are the sales and overhead with some benefit through consolidated buying and engineering supervision.

Manufacturing costs for cement are too high a percentage of the selling cost to offer the return upon the investment which may be obtained in many other lines.

It is very apparent that the selling price will not be likely to increase radically in the immediate future. Relief in this line must come from reduced production costs.

One of the most noticeable changes in the industry and one which offers much hope for the solution of the problems of the industry in a broad way is the gradual change in the mental attitude of the personnel of the industry. The traditional rule-of-thumb methods are gradually giving place to the engineering attitude of ascertaining the facts and working a solution of the problem along engineering lines. The chemist is still supreme in the control of the quality but the engineer is becoming recognized as a necessity in the processing and maintenance of equipment and is very necessary in the design of the plant.

A new conception of obsolescence will be necessary to properly assimilate the tremendous advances which have been made in the past few years without unpleasant consequences. There is no question that a modern mill with its few large units and carefully planned storage and handling system can operate with a much smaller force and higher fuel and power economy than the older mill. The mere installation of a few modern grinding or burning units in an old mill will not make it modern in the sense of operating with low labor cost. The electric public service companies have set a brilliant example of the benefits to be derived from the discarding of equipment in good operating condition whenever the newer equipment will show a sufficient saving to make the change profitable. Whole power plants have been discarded which are not fifteen years old because they could not be modernized at a sufficiently low cost or because they were not well located. It would be well for the cement industry to carefully watch this point as most of the plants built more than five years ago will more or less fall into this category. Some have realized this and have adopted measures to help themselves.

The development of the future may thus be expected along the lines of plants located in the vicinity of the larger cities to supply the local demand. These plants will be designed with large storages to iron out the seasonal fluctuations in demand. They will be designed for low labor and fuel costs with a few large well arranged units. The capacity will be governed by the local demand. Shipments will be largely by truck and probably the bulk shipment will be developed to the point where much of the cement will be sold by the ton instead of the barrel.

It is probable that the corporate organization will be along the lines of a number of plants operated under one supervisory management such as several of the companies now use although it is not likely that many of the plants will give up their independent character without stronger inducements than have been offered in the past.

From all indications the outlook is very favorable for those who are willing to look the situation squarely in the face and base their program on facts. There are difficulties ahead but none of them are unsurmountable. There are still many opportunities for improvement in processes with corresponding reductions in the operating costs, and the immediate future will doubtless bring the solution of many of these problems.

"Diamond Cement" Leaves on First Trip to Alaska

The freighter "Diamond Cement" of the Pacific Coast Cement Company sailed from Seattle February 26th on her initial voyage to the lime rock quarries on Dahl Island, Southeastern Alaska. Capt. J. E. Guptill is in command.

Penn-Dixie Plant Receives Association Award

The Pennsylvania-Dixie Cement Corporation plant at Kingsport, Tenn., has been awarded the Portland Cement Association safety trophy for operation throughout the calendar year of 1928 without a lost-time accident to any employee.

In discussing the award Blaine S. Smith, president of the corporation said "The record of our Kingsport plant is most gratifying; while the trophy was awarded for the calendar year of 1928 this plant has gone 486 consecutive days without a lost-time accident."

The Portland Point mill of the corporation operated without a lost-time accident through 1928 until the last few days of December, thereby missing the award of one of the association trophies. Mr. Smith stated that the 1928 accident record of the Penn-Dixie plants has been excellent and that the spirit within the organization was such that he looked forward to an even better showing in 1929.

Working on Plans for Torrance, California, Plant

W. H. Cleary, Detroit engineer, has taken charge of the construction of the plant the Hercules Portland Cement Company is erecting at Torrance, California. He is proceeding at once with the work of preparing plans and laying out the plant. H. H. Helbush, Los Angeles capitalist, is president of the company. The latter recently purchased the 150 acres upon which the plant is to be built.

It will be noted that the Hercules Portland Cement Company, and not the corporation of the same name, as may have erroneously been gathered from an item published in the February issue, is the backer of the project.

Bessemer Buys Property in Pittsburgh

The Bessemer Securities Company, holding company for the limestone and cement organization of the same name, will some time in the future build a cement plant on a tract of land just purchased at Pittsburgh, Pa., according to President L. A. Beeghly.

The property was purchased from the National Tube Company and adjoins a steel plant, whose slag it is planned to utilize. No announcement of the price paid for the property was forthcoming.

Spanish Cement Consortium Goes Into Effect

Advices from Spain state that the consortium, or union, of cement companies is about to go into effect. A few concerns have refused to become members.

The present consumption of cement in Spain is estimated at 2,000,000 tons a year, of which the consortium produces 1,200,000 tons. Imports amount to about 400,000 tons, and it is hoped to render these imports unnecessary within a year.

Tennessee Plant of Penn-Dixie Closes

The Clinchfield plant of the Pennsylvania-Dixie Cement Corporation at Kingsport, Tenn., closed down February 1st. A statement signed by President Blaine S. Smith was issued to the effect that the closing was merely a temporary measure to permit a study of the plant to be made, with possibilities of changes.

San Francisco Bay Plant Doubles Capacity

Description of Outstanding Equipment Installed in Second Unit of Pacific Portland Cement Company's Plant at Redwood City, California—A Slurry Sampling Device—New Dredging Equipment

By TOM WHITE

JUST three years ago, shortly after the completion of the new cement mill for the Pacific Portland Cement Company at Redwood City, California, CONCRETE published a short, descriptive article on the subject. The purpose of the present article is to set forth further details with particular reference to the new No. 2 unit, in the construction and operation of which modern engineering practice has developed a high degree of efficiency.

Unusual interest attaches to this plant because of the fact that instead of limerock, oyster shells from San Francisco Bay, on the shores of which the mill is situated, constitute the raw material. For this reason some of the operating details of the newer and larger dredge "Texas" will be included, as well.

The new unit at the plant was completed last fall and went into operation in September.

Showing the kilns in the new unit of the Pacific Portland Cement Company plant at Redwood City. They have a daily capacity of 1600 bbls. each

A view of a part of the Cottrell electrical precipitation installation. The platform on the stack from which samples of flue gas are taken for analysis may be seen in the background

The first major difference between No. 1 unit and No. 2 occurs in the raw grinding machinery. The old, or No. 1, unit consists of three Allis-Chalmers, three-compartment mills; the new installation comprises slightly larger mills—two Traylor 8 by 26 ft., driven at 19 r.p.m. by 650-h.p. motors and each having an hourly capacity of 80 bbls. The slurry is handled in the same manner as before, the next change being noted in the rope drive to the feeder at each kiln. This is a direct, positive method which insures absolute synchronization between the rotating speed of the kiln and the rate of feed, and is accomplished by means of a wire rope, directly "belted" to each kiln, driving a grooved pulley mounted on a shaft at the other end of which the feeder is driven through gears.

The general characteristics of the kilns in No. 1 unit have been followed in No. 2, although the new ones have

A view of the fire ends of kilns 3 and 4 which are a part of the new unit at the Pacific Portland plant

a one-foot greater diameter. The new kilns are straight throughout except for 60 ft. at the burning end which is slightly larger. Their dimensions are 11 by 10 by 235 ft. By reason of the increased diameter, the output of the new unit is greater than that of the old one—2800 bbls. for the former against 3200 bbls., or 1600 bbls. each, for the latter.

A further advance in mill practice was scored in the No. 2 unit with the installation of the Fuller-Kinyon conveying system, which permits of greater adaptability in transporting material than was possible with the old method of belt conveyors and elevators. There is also a minimum of dust, and greater safety for the workers due to the absence of belts. However, the old conveying system is also in place, being retained as a standby service.

There are two stock-houses. The old one has a capacity of 60,000 bbls.; the new one, 90,000 bbls. The new house was patterned, in a general way, after the old one. Track facilities and conveying machinery are so arranged as to permit of shipment being made from both stock-houses simultaneously, or only one. The plant being situated on tidewater, an ocean-going vessel can be loaded equally as fast as a train of box-cars having a corresponding capacity.

How the 15-inch suction dredge discharges shells into 400-ton barges

The Cottrell treaters for the electrical precipitation of dust particles in the flue dust are operating at 97 per cent efficiency, which is considered highly satisfactory. In order to take gas samples for laboratory analysis, a platform was erected on the new stack at a point near where the gases are discharged into the atmosphere. At this point a port is cut through opposing sides and presents a perfectly clear view, which is seemingly contradicted, under certain atmospheric conditions, when clouds of fume appear to issue from the stack. This is due to the amount of dampness in the air rather than the presence of solids. When the atmosphere is dry the "plume" is no more than 20 ft. long.

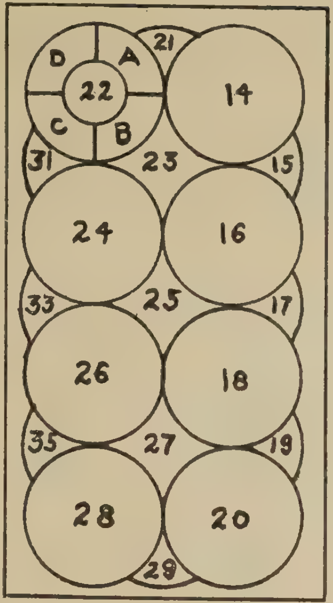
The type of bucket developed at the Pacific plant for taking sludge samples

Slurry Sampling Device

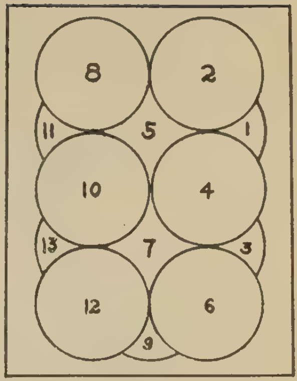
The plant chemists have evolved an ingenious type of sample bucket for use when taking samples of slurry from the tanks at varying depths. This bucket, with its trapdoor bottom, is clearly shown in the accompanying photograph. Samples are taken at 5-ft. intervals from the top to the bottom of the tank, then combined, mixed and analyzed in the laboratory as being typical of the slurry in a given tank. This method of sampling has been found eminently satisfactory.

The high speed, two-rail trolley type of crane, which unloads the shells from the barges with a four-cubic-yard bucket, is in service 24 hours a day. To insure continuous operation and guard against loss of time due to necessary repairing and overhauling of the crane carriage and motors, the whole "house" at the inshore end of the runway can be moved over to bring a spare carriage and its track directly into line with the main track. This is accomplished with practically no lost time.

As to the supply of raw material, it has been estimated that there are enough oyster shells on the bottom of the lower end of San Francisco Bay to last almost indefinitely. The depth of these deposits varies from four or five up to 30 ft. These shells are almost pure lime and have the added advantage of being far more economically worked than limerock.



Plan of stockhouse No. 2, *having a total capacity of* 90,000 *bbls.*



Bin arrangement in stockhouse No. 1, *which has a total capacity of* 60,000 *bbls.*

There are two dredges on the bag situated within five miles of the plant, the newer of them being the 15-in. suction dredge "Texas," operated by Diesel-electric power. This dredge has a slightly larger capacity than the "Golden Gate," or No. 1 dredge. Together they load 60 400-ton barges per week, which insures a daily output of 6,000 bbls. at the plant. At present, the "Texas" is working in a 15-ft. bed of shells and delivers approximately 4,500 cubic yards of materials in 8 hours. The "Golden Gate" is working in a five-foot deposit; and even if she were operating under the same condition as the "Texas" she could not equal the output of the newer dredge by 1000 yards. One hour and 20 minutes is the average time required by the "Texas" to load a barge.

This is the new dredge "Texas," which loads approximately 35 400-*ton barges weekly*

Two powerful Diesel towboats keep the dredges supplied with empty barges and move the loads to the mill. Here they are warped into line and unloaded by the crane directly into the storage bin.

The Cement Industry of Belgium

An Account of the Industry as a Whole and of One of the Larger Belgian Cement Companies—Important Mergers—Foreign Interests—Interesting Details of "C. B. R." Plant

THE reconstruction of the devastated regions of France and Belgium has been the cause of an abnormal demand for building materials and is largely responsible for the rapid growth of the cement industry of northern France and Belgium. Since the close of the World war cement production in these districts has nearly doubled and there is every reason to believe that there will be no slump in the cement market for many years to come. While the major portion of the reconstruction of the devastated regions is nearing completion there is a serious housing shortage in the cities of Belgium and France that will provide a steady market for cement and other building materials over an indefinite period.

Belgium is fortunate in possessing a series of limestone ridges and also the coal fields to furnish the fuel necessary for the mills. The raw materials necessary for the making of cement are found in Belgium in practically unlimited quantities, and in a remarkable state of purity. While cement is produced throughout the country the most important groups of mills are located on the rich chalk deposits of the Haine basin, along the limestone ridge running from Vise to Maestricht, upon the rich clay strata of the Rupel and the Campine regions, on the banks of the Scheldt and in the Tournai region.

Industry Past Century Mark

The cement industry in Belgium is a very old one. Limestone quarries were already being exploited, to the north of Liege, near Vise, before the invasion of Gaul by the Romans. However, it was not until 1824 that the Belgian cement industry began to occupy a really important place in the commerce of the country. At the present time the production of portland cement is one of the most important elements of her domestic commerce and forms a large part of her export trade.

Shortly after 1870 cement mills were constructed at Niel, on the Rupel, in the province of Antwerp, and in the province of Hainault. Since then many other mills have been built and today Belgium boasts more than 30 important cement mills. Most of these mills are situated in close proximity to centers where coal can be obtained in the easiest and cheapest manner.

Combine Controls Important Plants

Belgium boasts a large number of cement producing firms but the most important are controlled by the powerful combine known as the "Cimenteries et Briqueteries Reunies," (the United Cement and Brickworks, Limited), or "C. B. R.," as it is commonly called. This corporation was formed by the amalgamation or absorption of six of the largest firms in the country. On November 7th, 1910, the S. A. Fabrique de Ciment Portland artificial et Briqueteries "La Bonne Esperance," at Turnhaut, and the S. A. Fabrique de Ciment Portland artificiel de Loen, at Lixhe-Vise, amalgamated under the name of the Fabrique de Ciment Portland artificiel et Briqueteries de "Bonne Esperance." This concern then absorbed the S. A. Fabrique de Ciment Portland artificiel et Briqueteries de Raevels on the 11th of July, 1922, thus constituting the Cimenteries et Briqueteries Reunies de Bonne Esperance, Raevels et Loen.

In turn this new company absorbed, on January 29th, 1924, the important S. A. Ciments de Mons and adopted the present name of Cimenteries et Briqueteries Reunies. To this imposing group were next added in February, 1926, the S. A. North's Portland Cement and Brick Works, at Neerse, and the mill works at the S. A. Niel on Rupel. The "C. B. R." group controls six large cement works, and three brick works, besides being on close business terms with the three following companies: the S. A. Carrieres et Fours a Chaux et a Ciments du Coucou, an important enterprise, whose calcareous deposits occupy an exceptional geographical situation in the center of the Tournai basin, and are among the richest and most extensive deposits of this region; the S. A. Soliditit Belge, which markets special processes for surfacing roads with concrete; and the S. A. d'Affretements et d'Arrimages "Safar," an important shipping firm, at Antwerp.

Interest in Dutch Plant

Extending its industrial activities into foreign countries, the "C. B. R." took an important part in the creation of the E. N. C. I. "Eerste Nederlandsche Ciment Industrie," a Dutch company, whose mills are at present being constructed at Maestricht, and will be among the most up-to-date on the continent, and in the Fabrique Egyptienne de Ciment Portland Tourah, at Cairo.

This important group constitutes the most powerful and modern organization existing in Belgium for the production and sale of portland cement. The company possesses vast reserves of raw materials. Deposits of chalk and marl (calcareous clay) in the Haine Valley, near Mons and in the Vise Basin, large deposits of clay in the neighborhood of Boom and on the banks of the Scheldt, are of superior quality and can be easily worked.

All of the mills belonging to the "C. B. R." are situated on or near canals, and are served, for the transport of raw materials and fuel to the different mills, and for the shipment of the finished product, by the company's own river fleet, composed of 46 ships from 300 to 500 tons, most of them motor driven.

The company possesses its own shipyards at Cruybeke, where the units of this fleet are periodically examined, overhauled and repaired, and where new barges are built to cope with an ever-increasing demand.

Forty per cent of the cement production of Belgium comes from the "C. B. R.," whose mills at Loen, Raevels, Turnhaut, Beerse, Niel and Obourg-les-Mons are provided with the most modern and up-to-date equipment. These mills turn out annually a production of more than one million tons of portland cement of the best quality.

The company has a large and modern machine shop attached to its Raevels works. This machine shop keeps in running order all the equipment belonging to the different mills of the company and constructs any new material needed.

Due to its excellent geographical situation, the "C. B. R." is in a position to supply not only the home market but also that of the bordering countries and the export markets overseas.

The main offices of the "C. B. R." are in Antwerp, where the commercial department centralizes the sale and manages the shipment of cement to foreign countries, and where is located the technical department, which continually makes new experiments and studies means to replace manual labor by the most up-to-date and modern machinery.

The great progress realized during the past few years in the cement industry has permitted the manufacture of special cements which develop higher strengths after a few days than ordinary, good portland cement after four weeks. The "C. B. R." has placed upon the market a rapid hardening cement of great strength, which is comparable to the best known special cements of this kind. This special cement is called "Ceberit" and is used for construction work where speed and security are the principal factors.

The many improvements which the "C. B. R." has made to its various mills make it the largest cement producer on the continent. The modern equipment of the company permits it to produce, without overloading its machinery, more than a million tons annually.

The sales department of the "C. B. R." is located at Antwerp and is very well organized. The company is a member of the "Union des Cimenteries" of Brussels, an organization handling the sales in Belgium, Holland and France, of the product of the most important Belgian cement works. A large amount of the product of the "C. B. R." however, is shipped to overseas markets where its brands "Ceberit," "Mons," "Falcon," "Josson," "Good Hope," "Condor" and "Loen Works" are universally known.

Association Work

Belgium possesses an association of cement producers known as the "Groupement Professionel des Fabricants de Ciment Portland Artificiel de Belgique." This organization is patterned after the Portland Cement Association of the United States and the Portland Cement Association of Great Britain and is composed of the directors of the leading cement mills of Belgium. This group carries on an active campaign to make known all the uses to which concrete can be put and to standardize the methods of its use so as to obtain a correct, rational and economical use of portland cement in concretes and mortar.

The "Groupement Professionel" has been turning its activities toward developing a very high standard quality for portland cement in Belgium which all of its affiliated members are bound to respect, and in this effort it has established a service of control and inspection and a laboratory which is directed by an eminent specialist. This laboratory not only controls the work done by the members of the association but also studies new methods for better composition of the concrete and mortar for which the cement is used.

French Cement Firm Absorbs Competitor

The Societe Anonyme des Chaux et Ciments de Lafarge et du Teil of France has increased its capital to cover the cost of the absorption of the rival firm, Ciments du Calais. The latter company, capitalized at 8,500,000 francs, has a large mill, near the Atlantic seaport of Calais, with a yearly capacity of 100,000 tons of artificial cement.

Sandusky Interests Take Control of Crescent

Expansion of the Sandusky Cement Company was announced on January 15th through the purchase of more than 90 per cent of the capital stock of the Crescent Portland Cement Co., Wampum, near New Castle, Pa.

One thousand two hundred shares were purchased from former Crescent stockholders.

A new board has been elected and it has named the following as officers: J. B. John, president; E. J. Maguire, vice president and treasurer, and Fred Pickford, secretary. All of these men are officers of the Sandusky Cement Co. of Cleveland.

Directors consist of John Maguire, W. B. Newberry, Attorney A. C. Dustin, all of Cleveland; Andrew Berger and B. J. Jarrett, Pittsburgh.

The company will be operated as the Crescent Portland Cement Co., and no drastic changes are contemplated.

The Sandusky Cement Co. recently increased its capital stock from 75,000 to 225,000 shares and voted stockholders a two-for-one split.

Oregon Officers Re-elected

With one exception all officers of the Oregon Portland Cement Company were re-elected at a meeting on January 23rd, at Portland, Oregon. The retirement of Chester V. Dolph required the naming of another director and Lester W. Humphreys was chosen.

R. V. Butchart was re-elected president; H. A. Ross and L. C. Newlands, vice-presidents; H. L. Knappenberger, secretary and treasurer; F. E. Caslin, assistant secretary and treasurer, and Edward Cookingham and E. B. Ireland, other members of the board. Newlands also was renamed general manager.

Petoskey Officers Re-elected

At a stockholders' meeting of the Petoskey Portland Cement Company at Petoskey, Michigan, on January 23rd, Harry Lucas, Emery Nyman and George John were elected to the directorate. J. B. John, Homer Sly, Emery Numan, and L. A. Galster, were re-elected to their positions of president, vice-president, secretary and manager-treasurer, respectively.

Dedicate Pacific Coast Cement Laboratory

The chemical and physical cement laboratory at the new Seattle plant of the Pacific Coast Cement Company was officially dedicated at a luncheon held on January 17th at the plant in honor of the American Chemical Society.

Six Reasons for Safety

Pat Murphy attended a plant safety meeting. The boys had been given some printed instructions and the safety man wanted to check on results.

"Pat," he said, "can you give me six good reasons for Safety?"

Now Pat wasn't up on his reading but he was rather quick with his come-back.

"Sure," he replied, "The four little Murphys, me wife an' meself!"

MEN and MILLS

Notes from the Field

Lucas New Head of Superior Portland

Edwin P. Lucas, for Ten Years with Superior Portland Cement Inc., Succeeds Late John C. Eden; Other Officers Elected

Edwin P. Lucas of Bellingham, Washington, has been elected president of Superior Portland Cement Inc., succeeding the late John C. Eden, following a meeting of the board of directors on February 11th.

Lucas for more than a decade has worked in various capacities in the Superior plant at Concrete. When his predecessor and associates opened the Bellingham coal mines, ten years ago, Lucas was transferred there. He emerged as manager and gained a reputation for developing a high rate of production.

He arrived in the northwest about twenty-two years ago.

In addition to Lucas' election, George E. Dickinson, the present secretary of Superior Portland, was named a vice-president, and C. L. Wagner was selected vice-president in charge of operation.

M. L. Reid of San Francisco and Gordon Tongue, Seattle, were elected to the board of directors. Other officers and directors were re-elected.

Downey Leaves Association to Join Petoskey as Service Engineer

Burleigh R. Downey, formerly of the Portland Cement Association, resigned his position and on February 1st became associated with the Petoskey Portland Cement Company as service engineer. He had been employed as field engineer for the past five years.

Prior to his affiliation with the association he was in the service of the Michigan state highway department.

Becoming Less and Less Used

While its safety flag remains aloft, the average plant has not a great deal of use for its first aid room. This corner of one was snapped in a Lehigh Valley plant

Universal Appoints New Traffic Managers

Appointments by the Universal Portland Cement Company have been announced by B. F. Affleck, president, as follows: Murray N. Billings, western traffic manager, Chicago, and Frank E. Guy, eastern traffic manager, Pittsburgh.

In this position and also as traffic manager of the Illinois Steel Company, Mr. Billings succeeds F. T. Bentley, who has been connected with subsidiaries of the United States Steel Corporation for 35 years and with the cement company since its organization in 1906 and who last year retured from active service. He will continue in a consulting capacity.

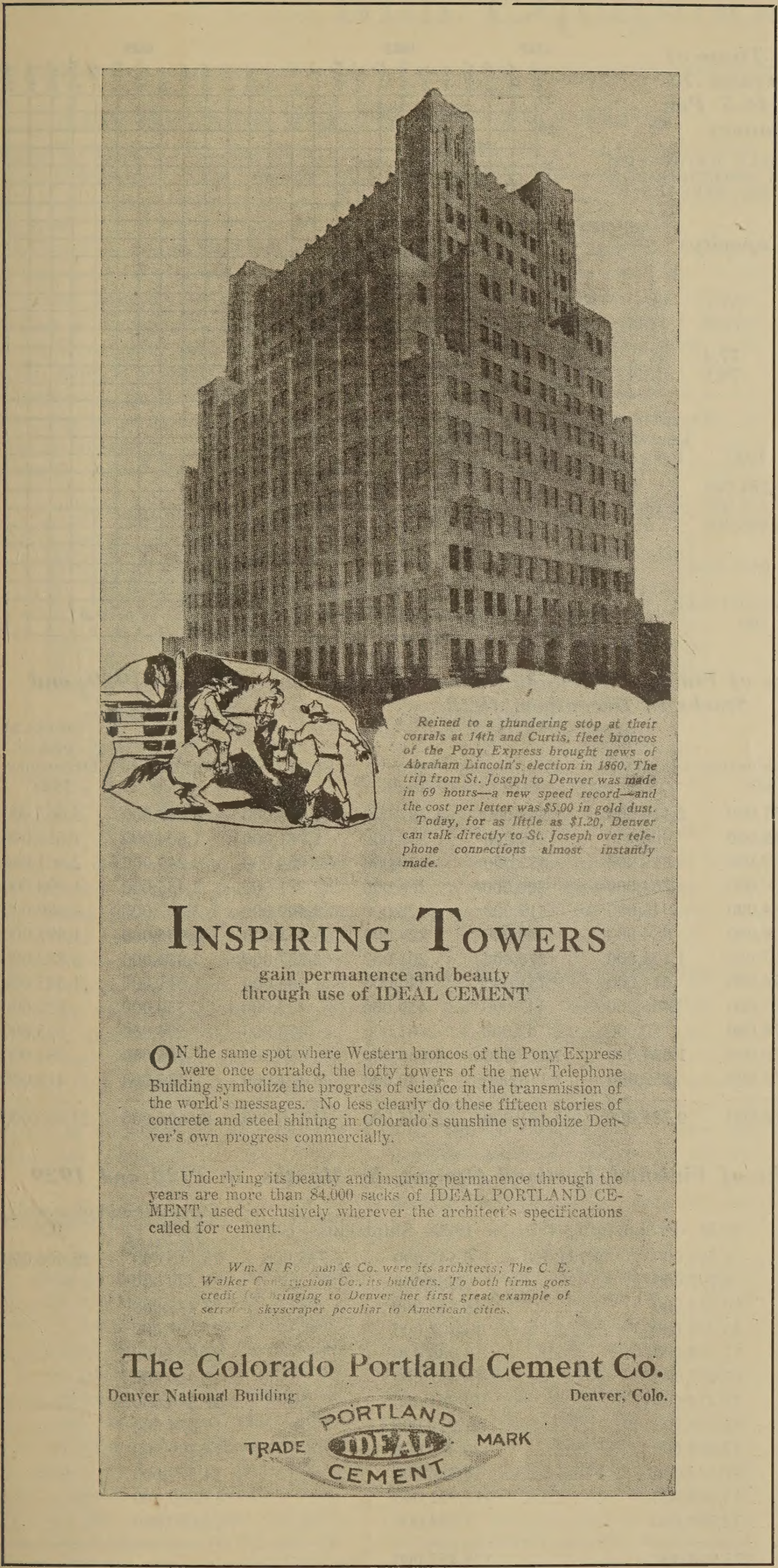
Mr. Billings is a former president of and is a director of the Traffic club of Chicago; was one of the organizers of and is a member of the executive committee of the Midwest Shippers' Advisory Board; chairman, traffic committee, Illinois Manufacturers' Association; chairman, rate committee, Chicago Shippers' Conference Association; member, executive committee, National Industrial Traffic League; and member, civic and industrial committee, Chicago Association of Commerce. He is a member of the Union League club, Exmoor Country club and Medinah Country club.

Mr. Guy succeeds L. C. Bihler, who also was traffic manager of the Carnegie Steel Company, a steel corporation subsidiary, and who has been made assistant to president and general traffic manager of that company. Mr. Guy has been assistant eastern traffic manager of the Universal company since 1912. He also served for 15 years in the traffic department of the Baltimore and Ohio railroad. He is a member of the transportation committee, Portland Cement Association; highway and bridges committee of the Pittsburgh Chamber of Commerce; Traffic club of Pittsburgh; Keystone Athletic club; Racquet club, Washington, D. C.; Castle Shannon Golf club and the Crafton Athletic Association.

Cowham Transfers Assistant Superintendent

Fritz Worm, who has been assistant superintendent of the cement plants of the Cowham System, has been transferred to the Alabama-Quenelda Graphite Company, to take charge of that company's plant in the vicinity of Birmingham.

From Corral to Skyscraper—Via Cement



Reined to a thundering stop at their corrals at 14th and Curtis, fleet broncos of the Pony Express brought news of Abraham Lincoln's election in 1860. The trip from St. Joseph to Denver was made in 69 hours—a new speed record—and the cost per letter was $5.00 in gold dust.

Today, for as little as $1.20, Denver can talk directly to St. Joseph over telephone connections almost instantly made.

INSPIRING TOWERS

gain permanence and beauty
through use of IDEAL CEMENT

ON the same spot where Western broncos of the Pony Express were once corraled, the lofty towers of the new Telephone Building symbolize the progress of science in the transmission of the world's messages. No less clearly do these fifteen stories of concrete and steel shining in Colorado's sunshine symbolize Denver's own progress commercially.

Underlying its beauty and insuring permanence through the years are more than 84,000 sacks of IDEAL PORTLAND CEMENT, used exclusively wherever the architect's specifications called for cement.

Wm. N. [illegible] & Co. were its architects; The C. E. Walker Construction Co., its builders. To both firms goes credit for bringing to Denver her first great example of [illegible] skyscraper peculiar to American cities.

The Colorado Portland Cement Co.

Denver National Building Denver, Colo.

PORTLAND
TRADE IDEAL MARK
CEMENT

With the erection of a skyscraper on ground used as a pony express corral in the '60's at Denver, Colorado, the Colorado Portland Cement Company conceived the above advertisement. It appeared recently in Denver newspapers.

Hartley to Superintend Bolivian Plant

O. A. Hartley, formerly superintendent of the Florida Portland Cement Company, member of the Cowham System, has been sent by the Cowham Engineering Company to take charge of production of a cement mill which is under the management of the Foundation Company and located in Lapaz, Bolivia.

Mr. Hartley has been superintendent of the Florida Portland Cement Company at Tampa, Florida, for the past two and one-half years. He sailed from San Francisco on February 9th and was to arrive in Lapaz about March 1st.

Mr. Hartley has been succeeded by Cyril Caron, who was employed by the company for five years at Mildred, Kansas.

Browne Succeeds Cleary at Wyandotte

Wm. H. Cleary, of Trenton, Mich., has resigned from his position as superintendent of the Wyandotte Portland Cement plant, Wyandotte, Michigan, to undertake the construction of the plant of the Hercules Portland Cement Company at Torrance, Calif.

Mr. Cleary has been succeeded on February 1st by Herbert Browne, for the past five years an efficiency expert with the Huron Portland Cement Company, at Alpena.

Mr. Cleary was the builder of the Wyandotte plant, which was put into operation two years ago.

Newaygo Basket Ball Team Re-elects Heads

At a meeting held in December, the Newaygo Cements basketball team organized and made plans for the season. Fay R. Burnes, who has managed the team for several years, was named to succeed himself as manager and Wm. A. Ansorge to continue in his capacity as treasurer.

C. F. Brooks New Keystone Advertising Manager

C. F. Brooks, formerly associated with the Portland Cement Association office at Philadelphia, has joined the Keystone Portland Cement Company as advertising manager.

He will also act as assistant to Ray Hillies, general sales manager of the company.

Druckenmiller Joins Penn-Dixie

B. W. Druckenmiller, for the past sixteen years associated with the Crescent Portland Cement Company of Wampum, Pa., is now connected with the Penn-Dixie Cement Corporation, New York City.

Cement Statistics for January

Shipments 12.3 Per Cent Below Those of January, 1928—Production Increases .13 Per Cent—Plants Operate at 46.5 Per Cent of Capacity During January

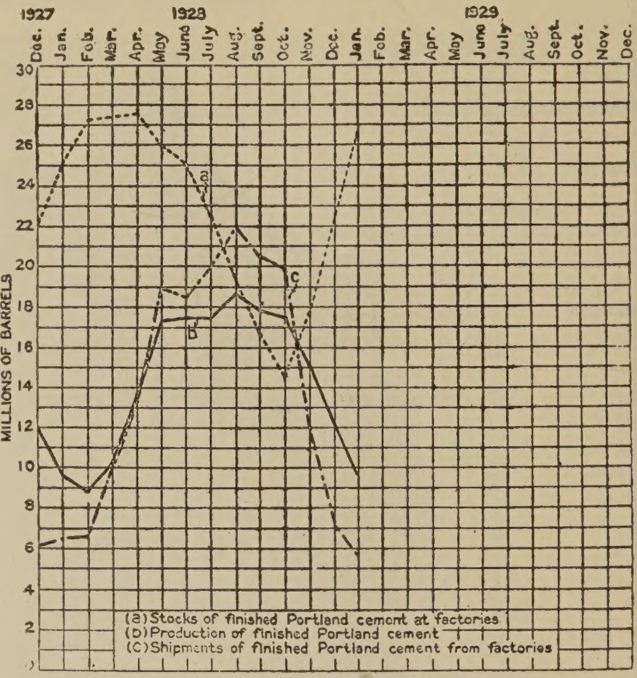
NOTE: IN ORDER THAT THE READER MAY KNOW THE TREND AT A GLANCE, THE HIGHER FIGURE, WHETHER FOR EITHER YEAR, UNDER ANY CLASSIFICATION APPEARS IN SLIGHTLY HEAVIER TYPE.

Relation of Production to Capacity

(Figures represent per cent)

	January 1929	January 1928	Dec. 1928	Nov. 1928	Oct. 1928
The month	46.5	**49.4**	60.4	77.4	87.1
The 12 months ended	71.0	**74.5**	74.0	74.1	73.8

	1928	1929	Increase or Decrease Per cent
Production, Jan.	9,768,000	**9,781,000**	.13
Shipments, Jan.	**6,541,000**	5,735,000	—12.3
Stocks at end of Jan.	25,116,000	**26,696,000**	6.3
Total production for year to date	(Same as first item)		
Total shipments for year to date	(Same as second item)		
No. of plants reporting	155	**160**	3.0



Production, Shipments and Stocks of Finished Portland Cement, by Districts, 1928 and 1929, and Stocks in December, 1928

District	Production—January 1928	Production—January 1929	Shipments—January 1928	Shipments—January 1929	Stocks at end of month 1928	Stocks at end of month 1929	Stocks at end of December, 1928*
Eastern Pa., N. J., and Md.	2,351,000	**2,410,000**	**1,545,000**	1,387,000	5,886,000	**6,087,000**	5,065,000
New York and Maine	**549,000**	405,000	**316,000**	257,000	**1,761,000**	1,804,000	1,656,000
Ohio, Western Pa., and W. Va.	752,000	**818,000**	**453,000**	430,000	2,903,000	**3,249,000**	2,861,000
Michigan	379,000	**704,000**	**300,000**	266,000	2,221,000	**2,435,000**	1,998,000
Wisconsin, Illinois, Indiana, and Ky.	**1,354,000**	946,000	**519,000**	328,000	**3,409,000**	3,307,000	2,689,000
Va., Tenn., Ala., Ga., Fla., and La.	**1,109,000**	884,000	**938,000**	824,000	1,851,000	**1,955,000**	1,895,000
Eastern Mo., Iowa, Minn., and S. Dak.	1,107,000	**1,198,000**	**276,000**	201,000	3,527,000	**3,879,000**	2,882,000
Western Mo., Nebr., Kansas, and Okla.	476,000	**614,000**	**451,000**	349,000	**1,655,000**	1,611,000	1,345,000
Texas	463,000	**466,000**	447,000	**459,000**	423,000	**530,000**	522,000
Colorado, Montana, and Utah	**176,000**	50,000	**67,000**	61,000	473,000	**524,000**	535,000
California	939,000	**1,034,000**	**1,111,000**	1,033,000	616,000	**785,000**	784,000
Oregon and Washington	113,000	**252,000**	118,000	**140,000**	391,000	**530,000**	418,000
	9,768,000	**9,781,000**	**6,541,000**	5,735,000	25,116,000	**26,696,000**	22,650,000

Production, Shipments and Stocks of Finished Portland Cement, by Months, in 1928 and 1929

Month	1928—Production	Production—1929	1928—Shipments	Shipments—1929	Stocks at end of month 1928	Stocks at end of month 1929
January	9,768,000	**9,781,000**	**6,541,000**	5,735,000	25,116,000	**26,696,000**
February	8,797,000	....	6,563,000	....	27,349,000	....
March	10,223,000	....	10,135,000	....	27,445,000	....
April	13,468,000	....	13,307,000	....	27,627,000	....
May	17,308,000	....	18,986,000	....	25,984,000	....
June	17,497,000	....	18,421,000	....	25,029,000	....
July	17,474,000	....	19,901,000	....	22,580,000	....
August	18,759,000	....	21,970,000	....	19,374,000	....
September	17,884,000	....	20,460,000	....	16,799,000	....
October	17,533,000	....	19,836,000	....	14,579,000	....
November	15,068,000	....	11,951,000	....	17,769,000	....
December	12,189,000	....	7,384,000	....	*22,650,000	....
	175,968,000	....	175,455,000	....	....	....

*Revised

Mill Equipment

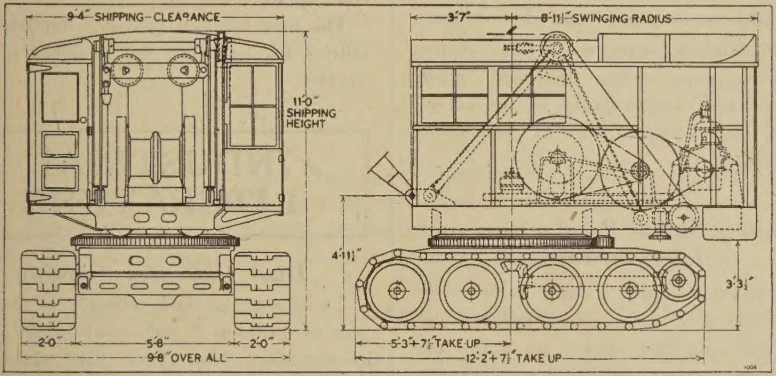
Link-Belt Adds Heavy Duty ¾-Yard Shovel

Link-Belt Company announces adding to its line a heavy-duty ¾ cu. yd. size of crawler shovel-crane-dragline, known as Type K-25.

The new heavy-duty ¾ yd. size is rugged and fast, is liberally powered, with gasoline engine, diesel engine, or electric motor drive, as desired, and is very easy to operate, according to the manufacturer.

As a shovel, it is equipped with ¾-yd. struck-measure capacity dipper.

As a dragline or crane, it will handle a ¾ cu. yd. bucket on a 40 ft. boom.



Features stressed by the maker incorporated are one-piece annealed cast steel lower frame; one-piece annealed cast steel rotating base; self-cleaning chrome steel crawler treads; large bronze-bushed crawler rollers; totally enclosed lower-frame travel gears, running in oil; full steel house enclosing operator and the machinery; unusual accessibility, and comfort for operator; quick and easy convertibility from shovel to crane, dragline, trench hoe, etc., or vice versa, without changing or disturbing the mechanism of the machine proper.

Renewable Heaters on New Relays

A complete new line of double- and triple-pole temperature overload relays is offered by the General Electric Company. The principal advantages of the new line are in the construction, which allows the user to remove and insert new heating elements when necessary, and which allows the use of a third relay unit on the same base when it is desired to protect three legs of a circuit, the manufacturer states.

The new line is divided into two parts, bearing the designations TC-121 and TC-131. The TC-121 relays are designed for the protection of two legs of a circuit, while the TC-131 provides an element for the protection of a third leg. Both forms are rated in current-carrying capacity from 30 to 150 amperes, and are available for either front or back connecting.

The back-connected forms are for panel mounting, but use the same base as on the front-connected forms. On enclosed panels, air drafts are eliminated by the enclosing case, but on open panels it is necessary to use a cover over the relay.

An electric reset is provided as an accessory. When used with a relay which is mounted at the bottom of a base, a sub-base is added. The sub-base is clamped to the main base by the relay itself. Where there is sufficient space, the reset relay can be mounted on the panel itself.

New Magnetic Switches to Simplify Installation

The General Electric Company announces the addition of two new switches to its general line of general-purpose starters for small alternating-current motors. The CR-7006-D-26-A is a three- and four-pole magnetic switch with self-contained "Start" and "Stop" stations, and the CR-7006-D-26-D is a switch for similar service but especially designed to provide plenty of wiring space.

The RR-7006-D-26-A is of standard design incorporating features for overload protection and undervoltage protection or release. It is used for starting and protecting small alternating-current motors that can be thrown directly on the line. It consists of a triple-pole, barrier-type contactor and a double-coil temperature overload relay, all mounted on a moulded base in a drawn-shell steel enclosing case. Added to these are starting and stopping contacts ordinarily provided by a remote-control push-button station. It is expected to be of particular value when used in installations where it is desired to locate magnetic switches at the driven machines, making remote push-button control unnecessary.

The CR-7006-D-26-D, although for the same general class of application, is designed for use with remote push-button stations. Its principal advantage is the especially large amount of wiring space provided. Mechanically, the switch mechanism is located below the center of the box to prevent interference with the mounting holes.

Notes from the Field

Timken Prepares for Expansion

The Timken Steel and Tube Company has put into effect an expansion program for the coming year that will necessitate expenditures in the neighborhood of $1,000,000. A tract of land 200 acres in extent has been purchased, which extends 2 miles west of the company's present holdings. This will provide room for future expansion of the plant facilities on the present basis of straight line production.

Work has already been started on the first unit, a tube mill, which will be housed in a building 320 feet wide by 420 feet long. It is being erected at a cost of over half a million dollars for building and equipment. This mill will be completed and put into operation by April 1st. Other extensions to the production facilities of the company will be made later.

Cutler-Hammer Subsidiary

Cutler-Hammer, Inc., Milwaukee, Wisconsin, announces that it has acquired the business of the *Trumbull Vanderpoel Electric Manufacturing Company*, of Bantam, Conn., which will be operated as a subsidiary under its present name.

This purchase will add a complete line of meter service and safety switches to the present Cutler-Hammer line of motor control, wiring devices and allied electrical items.

Wilson Manager of Brown Office

The Brown Instrument Company, Philadelphia, Pa., announces that *O. B. Wilson*, has been placed in charge of the company's Cleveland, Ohio, office, 819 Hippodrome Building.

Mr. Wilson has been with the Brown Instrument organization over 5 years and has had extensive experience in serving the needs of instrument users from the home office and in the New York sales territory.

With the Manufacturers

Refractory Companies Consolidated

Consolidation of six of the companies in the fire brick and refractories manufacturing and selling fields, owning fifteen plants in Pennsylvania, Ohio, Kentucky and Missouri, into one organization known as North American Refractories Company, has been announced. The new company, which is organized under the laws of Delaware, will be the third largest of its kind in the United States.

The units to be acquired by *North American Refractories Company* include *Ashland Fire Brick Company* of Ashland, Kentucky; *Crescent Refractories Company*, Curwensville, Pa.; *Dover Fire Brick Company*, Cleveland, Ohio; *Elk Fire Brick Company*, St. Marys, Pa.; *Farber Fire Brick Company*, Farber, Missouri; *Queens Run Refractories Company*, Inc., Lock Haven, Pa.

All of the companies have been engaged in the fire brick and refractories business for some time, the oldest having been in operation for more than 75 years, and the youngest over 10. Capacity of the company's fifteen plants is estimated at 155,000,000 bricks per year.

Officers and directors are: John D. Ramsay, president; E. M. Weinfurtner, first vice president; H. E. Stuhler, vice president; J. M. McKinley, vice president; E. H. Gartrell, vice president; Harry A. Sleicher, vice president; John H. Cavender, vice president.

Directors, in additions to the officers, are Frank H. Deal, Harry A. Sleicher, Alfred S. Zopfi, Wm. K. Brownlee, James B. Graham, Wm. G. Bauer, and Henry Lockhart, Jr., and Charles H. Marvin.

Du Pont Men Meet

Nearly 100 representatives attended the twelfth annual convention of the technical section of the Explosives Department of *E. I. du Pont de Nemours & Company* at Wilmington, Delaware, February 5th, 6th and 7th, a report from the company states. Besides the explosives technical force of the field and the main office, there were present company executives, officials of the explosives department, heads of the chemical staff, plant managers and representatives of the sales and the advertising departments.

Pellet powder was a principal topic of discussion. In this connection, the fact was developed that a high percentage of the du Pont black powder mill production is now pellet powder, while 40 per cent of the total sales of black powder is for use in coal mines.

Safety in the underground handling of explosives and co-operation among mine officials and company technical men with a view to the more efficient uses of permissibles and other types of powder were given lengthy consideration.

Practically every phase of the uses of explosives for industrial purposes was covered in discussions which included tunneling, quarrying, coal and ore mining, and other work requiring dynamite, permissible high explosives, black powder, pellet powder and other types. Blasting caps, fuse, blasting machines and other accessories were subjects of papers and discussions.

L. P. Mahony, director of sales of the explosives department, discussed trade practices and various angles of the activities of the technical staff in connection with sales work.

Timken Starts Production on Larger Scale

Construction work having been completed, the new mill of the *Timken Steel and Tube Company* started on a full capacity production schedule on January 17th. The production facilities consist of the most modern furnaces and rolling equipment, and give the plant a capacity of 30,000 tons of high grade alloy steel per month. A wide variety of sections and sizes of hot rolled bar stock, or seamless tubing can be supplied. Special high grade alloy steels can be produced conforming to any analysis specified, with assurance of absolute uniformity.

There are several interesting features in connection with the plant as a whole, an announcement by the company states. The capacity is about equally divided between electric furnace and open hearth steels, thus making it the largest producer of electric steel on record. Furthermore, it is the first plant of its kind to be completely anti-frictionized; every shaft in it from mill roll necks and main gear drives to table rollers is equipped with Timken bearings. And, lastly a system of straight line production has been developed which permits rapid completion, not only of quantities of steel of standard analyses, but of those where special analyses are specified as well. The latter has been made possible by the flexibility in the system which allows for the particular treating requirements of certain alloys without interfering with the rapidity of material movement.

For further speed in handling shipments a warehousing system has been provided that serves two particular ends. It prevents the possibility of confusion among steels of different analyses. It also permits the carrying of large stocks of steels of standard analyses so that such material can be supplied with the least possible delay.

Brown Office Moves

The Buffalo, N. Y., office of the *Brown Instrument Company*, Philadelphia, Pa., is now located at 402 Marine Trust Building, having recently removed from 624 Ellicott Square.

The new location provides improved facilities for handling the business in this district.

INDUSTRIAL LITERATURE

Dust Collector Catalog

The *Vorticose* dust collector is the subject of Bulletin 2 published by *Dust Recovery, Inc.*, New York City. It covers their construction, operation, advantages and applications.

Of particular interest is the somewhat brief description of the testing of dust collectors.

According to the manufacturer, practically the entire cost of operation is composed of the power required for inducing the gases through the apparatus.

On Amsco Products

The January issue of the 4-page publication of the *American Manganese Steel Company*, devoted chiefly to new applications and unusual uses of its products, includes several items on equipment that has seen strenuous service and in a number of instances, illustrations are shown.

The American company produces Amsco manganese steel, Fahralloy, and other Amsco alloys and products.

Traylor Crushing Rolls Described

Its crushing rolls, for reducing clinker, are described in a folder published by the *Traylor Engineering & Manufacturing Co.*, Allentown, Pa.

The rolls, according to this publication, are offered in four types and thirty sizes, and are built to meet with every conceivable requirement.